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COMPLETED

ORIGINAL

CONVENTION ON THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES

NOVEMBER 30, 1981.—Ordered to be printed

Mr. PERCY, from the Committee on Foreign Relations, submitted the following

REPORT

[To accompany Ex. X, 96-2]

The Committee on Foreign Relations, to which was referred the Convention on the Conservation of Antarctic Marine Living Resources adopted at a diplomatic conference held in Canberra, Australia, May 7–20, 1980, and signed on behalf of the United States on September 11, 1980, with a Proces-Verbal of Rectification dated March 18, 1981, having considered the same, reports favorably thereon without reservation and recommends that the Senate give its advice and consent to ratification thereof.

PURPOSE

The primary purpose of the Convention on the Conservation of Antarctic Marine Living Resources is to establish international mechanisms and legal obligations necessary for the protection and conservation (including rational use) of the marine living resources found in the waters surrounding Antarctica.

BACKGROUND

The Convention on the Conservation of Antarctic Marine Living Resources was adopted at a diplomatic conference held in Canberra, Australia, May 7–20, 1980. The Convention was opened for signature on August 1, 1980 and was signed on behalf of the United States Ambassador to Australia on September 11, 1980.

Fifteen nationals participated in the Canberra Conference: the thirteen nations which are Antarctic Treaty Consultative Parties—Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, Poland, South Africa, the U.S.S.R., the U.K. and the U.S.—as well as the Federal Republic of Germany, and the German Democratic Republic. Observer delegations from the European Community (EC), the United Nations Food and Agriculture Organization

(FAO), the International Whaling Commission (IWC), the International Union of the Conservation of Nature and Natural Resources (IUCN), the Scientific Committee on Oceanic Research (SCOR), the Scientific Committee on Antarctic Research (SCAR) and the International Oceanographic Committee (IOC) also attended the conference.

It is widely accepted that the Convention on the Conservation of Antarctic Marine Living Resources is an important conservation agreement. It provides for an ecosystem approach to the management of the marine living resources found in the waters surrounding Antarctica and creates the obligations and machinery necessary to implement this approach. The Convention is also an important political agreement. Its conclusion reflects creative accommodations among those states active in and around Antarctica, who have differing positions on territorial sovereignty and related maritime jurisdiction in Antarctica. The system it establishes will also permit the Parties to make the accommodations necessary to develop and implement effective management measures.

The Department of State worked with the interested agencies of the Federal Government in developing and negotiating U.S. positions with regard to the Convention on the Conservation of Antarctic Marine Living Resources. In addition, close liaison was maintained with the Congress, affected interest groups, and the public at large during the negotiating process. Represenatives of public interest groups and the Congress were afforded the opportunity to serve on U.S. delegations to the sessions of the Special Consultative Meeting and to the diplomatic conference which drafted and concluded the Convention.

The Department of State strongly supports early ratification of the Convention on the Conservation of Antarctic Marine Living Resources. The Convention serves important U.S. enviromental and resource management interests as well as our long-term political and legal interests in maintaining Antarctica as an area of peaceful international cooperation. The Department of Commerce, the National Science Foundation and the Marine Mammal Commission, which participated with the Department of State in the negotiation of this Convention, concur in this view. Early ratification of the Convention is especially desirable to enable the United States to be a full participant at the first meeting of the Commission to ensure that the conservation concerns which have been a primary U.S. interest in the negotiations receive full attention as the Commission begins its operation.

PRIMARY PROVISIONS

(*a*) *Summary*

In summary, the Convention provides that:

The purpose of the regime be the conservation, including rational utilization, of Antarctic marine living resources;

The regime apply to the populations of all living resources of the Antarctic marine ecosystem, defined as all species, including birds, found in marine areas south of the Antarctic Convergence, and their relations with each other and with their physical environment;

Any harvesting of Antarctic marine living resources be conducted in accordance with a conservation standard, incorporating an ecosystem approach, and reflecting the following elements:

(a) maintenance of populations or species of Antarctic marine living resources at levels which offer maximum annual production on a continuing basis;

(b) maintenance of the balance among the species composing the Antarctic marine ecosystem, taking into account the relationships between harvested and non-harvested species;

(c) prevention of irreversible changes in the Antarctic marine ecosystem.

A commission of the Contracting Parties be established to implement the conservation standard and undertake actions necessary to ensure the effective operation of the regime;

The commission develop, adopt and revise conservation measures, including total catches in the area as a whole or in subareas defined on the basis of the range of specific populations of Antarctic marine living resources; open and closed seasons and areas, protected species; gear and effort regulation and other steps necessary to fulfill the purposes of the regime;

A scientific committee be established to provide the commission with independent and expert advice, analyses and recommendations to the commission;

The scientific committee's functions include assessment of the status and trends of the populations of Antarctic marine living resources, analysis of data on the effects of harvesting on populations of Antarctic marine living resources, assessment of the effects of changes in harvesting levels and proposed conservation measures and identification of research needs and development of proposals to meet such needs;

A secretariat be established to serve the commission and scientific committee;

Contracting parties be obligated to provide data required by the commission and the scientific committee to carry out their functions, including regular and detailed reporting on harvesting activities carried out by their nationals and vessels;

Contracting parties be obligated to ensure compliance with the provisions of the Convention and measures adopted by the commission;

A system of international observation and inspection be established to oversee compliance with provisions of the Convention and measures adopted by the commission;

The commission and scientific committee ensure close coordination between their activities and those of the International Whaling Commission and those pursuant to the Convention for the Conservation of Antarctic Seals;

The commission and scientific committee establish cooperative relationships with other international inter-governmental and non-governmental bodies which have responsibilities for Antarctic marine living resources, such as FAO, SCAR and IUCN;

The budgetary expenses of the commission and other organs of the regime be apportioned equitably among the contracting parties;

Accession to the regime be open to states engaged in research on, or harvesting of, Antarctic marine living resources;

Issues relating to the existence and nature of maritime jurisdiction be treated in such fashion as to permit and encourage participation in the regime by all states engaged in research on or in harvesting of Antarctic marine living resources and as to protect the position of the United States regarding non-recognition of claims to territorial sovereignty in Antarctica.

(*b*) *Detailed explanation*

The following is a detailed description of the Convention provided by the Department of State on October 29, 1980, in its letter of submittal to the President:

DEPARTMENT OF STATE,
Washington, October 29, 1980.

THE PRESIDENT,
The White House.

THE PRESIDENT:

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THE TEXT OF THE CONVENTION

The Convention consists of thirty-three articles. Article I provides that the Convention apply to the Antarctic marine living resources found south of the Antarctic Convergence. The location of the Convergence, for the purposes of the Convention, is defined by specific geographic coordinates. The article makes clear that the Convention applies to all species of living organisms south of the Convergence.

Article II establishes as the objective of the Convention the conservation (including rational use) of Antarctic marine living resources. To this end the Article sets forth a conservation standard in accordance with which all harvesting and associated activities must take place. The conservation standard (paragraph 3 of Article II) establishes three important principles to ensure that any harvesting of Antarctic marine living resources take place in a manner designed to afford the greatest protection possible to the Antarctic marine ecosystem.

These principles provide for:

—prevention of decrease in the size of any harvested population to levels below those which ensure its stable recruitment (below a level close to that which ensures that greatest net annual increment);

—maintenance of the relationships between harvested, dependent and related populations; and

—prevention of irreversible changes in the Antarctic marine ecosystem.

These principles are to be applied as an interrelated whole. As such, they constitute a strict ecosystem standard which all harvesting and associated activities under the Convention must meet.

Article III extends to Contracting Parties which are not parties to the Antarctic Treaty the obligations contained in Articles I and

I of the Antarctic Treaty. Those articles provide that Antarctica shall be used exclusively for peaceful purposes and prohibit military activities, nuclear explosions and the disposal of radioactive waste in Antarctica. This article of the Convention is designed to ensure that all Contracting Parties, active in the seas surrounding Antarctica, will be bound by the same obligations.

Article IV of the Convention is the important juridical article which makes clear that the Convention, as well as actions and activities thereunder, do not prejudice the basic position of the Contracting Parties on claims to territorial sovereignty and related maritime jurisdiction in the Convention area. Therefore, the Convention in no way affects the position of the United States under the Antarctic Treaty with regard to territorial sovereignty in Antarctica. It is the U.S. position under the Antarctic Treaty neither to assert nor to recognize claims to territorial sovereignty in Antarctica. As a corollary of this position, the United States does not resognize that a claim to territorial sovereignty in Antarctica is capable of creating any sort of maritime jurisdiction. In our view, for instance, the reference to coastal state jurisdiction in Article IV is understood to refer only to waters around islands within the Convention area north of 60 degrees South Latitude.

Article V establishes an additional link between the Convention and the Antarctic Treaty. Under the Antarctic Treaty system, the Antarctic Treaty Consultative Parties are bound by obligations to preserve and protect the Antarctic environment, including the native fauna and flora of Antarctica. Article V provides that Contracting Parties to the Convention, which are not Antarctic Treaty Consultative Parties, will observe, as and when appropriate, such obligations undertaken by the Consultative Parties.

Article VI provides that the Convention does not derogate from the rights and obligations of Contracting Parties under the International Whaling Convention or the Convention for the Conservation of Antarctic Seals. The effect of this article is to recognize that direct regulation of the whales and seals covered by those conventions will not be undertaken by the new Convention. However, those species are covered by the new Convention specifically in the application of its conservation standard. In other words, the role of these species in the Antarctic marine ecosystem and the impact upon them of any harvesting of other species has to be taken into account in development of conservation measures under the Convention.

Articles VII through XIV relate to the creation. functions, and institutional make-up of the Commission and Scientific Committee to be established by the Convention.

The Convention provides for the establishment of the Commission for the Conservation of Antarctic Marine Living Resources to give effect to the principles and objective of the Convention. Its headquarters will be located in Hobart. Tasmania.

The functions of the Commission are set out in Article IX. Its primary function is to give effect to the objectives and principles set forth in Article II (which defines the Convention's conservation standard). To this end, the Commission is charged with:

—facilitation of research and comprehensive studies of Antarctic marine living resources and of the Antarctic marine ecosystem;

—compilation of data relating to populations of Antarctic marine living resources;
—acquisition of catch-and-effort statistics on harvested populations;
—analysis and publication of such data and statistics;
—identification of conservation needs and analysis of the effectiveness of conservation measures;
—formulation, adoption and revision of conservation measures;
—implementation of the Convention's system of observation and inspection;
—carrying out such other activities as are necessary to fulfill the objective of the Convention.

Article IX also includes an illustrative listing of the types of action that might be included in conservation measures taken by the Commission. The listing makes clear that the Commission may draw on the full range of such measures in pursuing the objective of the Convention.

Conservation measures adopted by the Commission become effective upon all its members 180 days after their adoption, unless within 90 days of adoption there is objection by a government of a member of the Commission. In that case the conservation measure in question would remain in force for other members of the Commission unless they too decide not to implement the measures. There is also provision for the Commission to convene in special session to review any conservation measure to which an objection has been made.

Article XII deals with the important issue of decisionmaking in the Commission. It provides that decisions on all matters of substance be taken by consensus. The article also provides the terms by which a regional economic integration organization, which is a member of the Commission, would participate in the decisionmaking process. (The provisions of the article incorporate a key element of the compromise on EC participation in the Convention).

Article XIV provides for the establishment of the Scientific Committee for the Conservation of Antarctic Marine Living Resources as a consultative body to the Commission. Each member of the Commission is to be represented on the Scientific Committee, whose role is to provide expert and independent advice to the Commission. The specific functions of the Scientific Committee, set forth in Article XV, include establishment of criteria and methods for determining conservation needs with regard to Antarctic marine living resources; assessment of their populations; analysis of data and other scientific information relating to these resources; transmission of assessments, analyses, reports and recommendations to the Commission; and formulation of proposals regarding needed research on Antarctic marine living resources.

Article XVII provides for the appointment of an Executive Secretary, along with a permanent secretariat staff, to serve the Commission and Scientific Committee. The Convention provides (Article XVIII) that the official languages of the Commission shall be English, French, Spanish and Russian.

Article XIX establishes that the budget of the Commission for the first five years of its operation shall be based upon equal contributions

from the members of the Commission. Thereafter, a formula is to be developed which will include the levels of harvesting of Antarctic marine living resources by Commission members as a factor in the budget contribution formula. Such new formula, anticipated after the first five years of Commission operation, is to be developed by the Commission.

Article XX imposes the obligation upon members of the Commission to provide necessary scientific data to the Commission, including information about their harvesting activities. It provides that members of the Commission keep the Commission informed of their efforts to implement conservation measures in force. Each member of the Commission is also obligated to take advantage of all opportunities, including harvesting activities, to collect data necessary for informed decisions on conservation measures.

Article XXI requires each Contracting Party to take all appropriate steps within its competence, including enactment of legislation if necessary, to ensure compliance with the Convention and measures taken thereunder. Article XXII also requires Contracting Parties to take steps consistent with the United Nations Charter to ensure that no one engages in activities contrary to the objective of the Convention.

Article XXIII provides for close cooperation between the Commission for the Conservation of Antarctic Marine Living Resources and the Scientific Committee, on the one hand, and relevant intergovernmental and non-governmental organizations on the other. These organizations include FAO, SCAR, SCOR, and the IWC.

Article XXIV provides for the establishment by the Commission of a system of observation and inspection to promote the objective and ensure observance of the provisions of the Convention. The article sets forth general principles upon which the system of observation and inspection is to be based and provides for the establishment of interim inspection and observation arrangements pending establishment of the formal system by the Commission.

Article XXV provides for a non-binding dispute settlement procedure similar to that contained in the Antarctic Treaty.

Articles XXVI through XXXIII relate to participation in, and entry into force of, the Convention. The Convention is open from August 1 to December 31, 1980 for signature by those States participating in the diplomatic conference. The Convention will enter into force on the 30th day following the deposit of the eighth instrument of ratification, acceptance, or approval. The Convention is open to accession by states interested in research or harvesting activities in relation to Antarctic marine living resources. Regional economic integration organizations which (a) include among their members a state member of the Commission and (b) to which member states have transferred in whole or in part legal competence covered by the Convention, may also accede to the Convention.

The Convention provides for amendment upon agreement by all members of the Commission. It also includes a withdrawal provision.

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Respectfully submitted.

EDMUND S. MUSKIE.

ENTRY INTO FORCE

The Convention will enter into force on the 30th day following the deposit of the eighth instrument of ratification, acceptance, or approval. As of November 1, 1981, 6 nations have either ratified, accepted or approved this Convention.

COMMITTEE ACTION

The Committee on Foreign Relations held a public hearing on this Convention on October 27, 1981. At that time, the following witnesses testified in favor of the Convention: Mr. R. Tucker Scully, Director of the Office of Oceans and Polar Affairs, Bureau of Oceans and International Environmental and Scientific Affairs, Department of State; Mr. John R. Twiss, Jr., Executive Director, Marine Mammal Commission; and Dr. William Y. Brown, Senior Staff Scientist, Environmental Defense Fund, Inc. The transcript of that hearing is printed as an appendix to this report.

On November 10, 1981, the Committee considered this Convention and by voice vote of a quorum of the Committee ordered the Convention reported favorably to the Senate with a Process-Verbal of Rectification for its advice and consent to ratification. The Committee is not aware of any opposition to this Convention.

PROCESS-VERBAL OF RECTIFICATION

On September 24, 1981, the Department of State transmitted to the Committee on Foreign Relations the following communication enclosing a copy of a Process-Verbal of Rectification signed on March 18, 1981, correcting a number of errors or linguistic inconsistencies between the various translations of the Convention:

DEPARTMENT OF STATE,
Washington, D.C., September 24, 1981.

Hon. CHARLES H. PERCY,
Chairman, Committee on Foreign Relations, U.S. Senate.

DEAR MR. CHAIRMAN: Enclosed is a Proces-Verbal of Rectification of the text of the Convention for the Conservation of Antarctic Marine Living Resources, 1980. This Convention was submitted to the Senate for advice and consent to ratification and is printed in Senate Executive X, 96th Congress, 2nd Session.

As noted in the Proces-Verbal of Rectification, the corrections have been made in the original text of the Convention which is deposited with the Government of Australia. We would appreciate it if the Committee on Foreign Relations and the Senate would consider the text of the Convention as rectified accordingly.

It is suggested, if you consider it appropriate, that the Report of the Committee on Foreign Relations with respect to the Convention might contain the text of the Proces-Verbal of Rectification and that the Senate Resolution might refer to the Convention as recified by the Proces-Verbal of March 18, 1981.

Sincerely,

RICHARD FAIRBANK,
Assistant Secretary for Congressional Relations.

Enclosure: Proces-Verbal of Rectification.

Whereas a Convention for the Conservation of Antarctic Marine Living Resources was drawn up at Canberra on 20 May 1980; and

Whereas an examination of the originals of the Convention has revealed a number of errors or linguistic inconsistencies between the English, French, Russian and Spanish texts; and

Whereas the Department of Foreign Affairs in Notes dated 22 October and 12 November 1980 communicated to Governments which had signed the Convention certain corrections which the Government of Australia, as the depositary of the Convention, proposed to make to the originals of the Convention; and

Whereas there has been no objection from governments of States which signed the Convention to the proposed corrections set out in the Schedule hereto;

Now therefore I, the undersigned William Harry Bray, hereby declare that I have caused the said corrections to be made to the texts of the original of the Convention deposited with the Government of Australia.

In witness whereof I have signed this procè-verbal and affixed the seal of the Department of Foreign Affairs.
Dated this eighteenth day of March One thousand nine hundred and eighty-one.

WILLIAM HARRY BRAY,
Assistant Secretary,
General Legal and Treaties Branch,
Department of Foreign Affairs, Canberra.

SCHEDULE

CORRECTIONS TO THE AUTHENTIC ENGLISH TEXT

In the Annex for an Arbitral Tribunal, number the paragraphs 1., a), b), 2., 3., 4., 5. and 6. consecutively.

In the Annex for an Arbitral Tribunal, in paragraph 7, line 3, substitute "proceedings and shall" for "proceedings shall".

CORRELATIONS TO THE AUTHENTIC FRENCH TEXT

In Article II, paragraph 1, line 1, substitute "objectif" for "objectifs".

In Article VIII, line 6, substitute "Commission" for "Convention".

In Article IX, subparagraph 1.c) line 2, substitute "efforts" for "movens".

In Article XIII, paragraph 2, line 9, substitute "Parties contractantes" for "membres de la Commission".

In Article XV, subparagraph 2.e), line 1, substitute "sur" for "à sa".

CORRECTIONS TO THE AUTHENTIC FRENCH TEXT

In the Annex for an Arbitral Tribunal, number the paragraphs 1., a), b), 2., 3., 4., 5. and 6. consecutively.

CORRECTION TO THE AUTHENTIC SPANISH TEXT

In Article IX, paragraph 5, lines 4 and 5, substitute "por comisiones de pesca existentes encargadas de especies" for "por comisiones de pesca encargadas de especies".

In the Annex for an Arbitral Tribunal, number the paragraphs 1., a), b), 2., 3., 4., 5. and 6. consecutively.

RESOLUTION OF RATIFICATION

Resolved, (*two-thirds of the Senators present concurring therein*), That the Senate advise and consent to ratification of the Convention on the Conservation of Antarctic Marine Living Resources adopted at a diplomatic conference held in Canberra, Australia, May 7–20, 1980, and signed on behalf of the United States on September 11, 1980, with a Proces-Verbal of Rectification dated March 18, 1981.

APPENDIX

The following is the transcript of the hearing conducted on October 27, 1981, on EX. X, 96–2, the Convention on the Conservation of Antarctic Marine Living Resources, chaired by the Honorable Larry Pressler.

Senator PRESSLER. This meeting will come to order.

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We will hear first from Mr. R. Tucker Scully, Director of the Office of Oceans and Polar Affairs, Bureau of Oceans and International Environmental and Scientific Affairs of the Department of State.

Mr. Scully.

STATEMENT OF R. TUCKER SCULLY, DIRECTOR, OFFICE OF OCEANS AND POLAR AFFAIRS, BUREAU OF OCEANS AND INTERNATIONAL ENVIRONMENT AND SCIENTIFIC AFFAIRS, DEPARTMENT OF STATE

Mr. SCULLY. Thank you, Mr. Chairman.

I have statements on both of these agreements which I will submit for the record, and I would like to briefly summarize the points in each of them.

Accompanying me today is Mary McLeod of our Office of the Legal Advisor and Karen Stewart of our Office of Fisheries Affairs, both of whom are seated behind me.

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Turning to the Antarctic agreement, Mr. Chairman, the Convention on the Conservation of Antarctic Marine Living Resources, the Department of State also fully supports the early entry into force for the United States of that Convention and also urges the Senate to act rapidly to give its advice and consent to ratification.

This Convention, we believe, is a significant and innovative conservation agreement. It will establish international machinery and create legal obligations necessary for the protection and conservation of the marine living resources found in the waters surrounding Antarctica. The Convention is based upon an ecosystem-wide approach to management of those living resources.

The implementation of this Convention offers an unusual opportunity to elaborate and apply an effective management framework to shared resources before they become the subject of significant exploitation and pressure. The conclusion of the Convention represents an important example of the international cooperation among those states active in Antarctica who have been active pursuant to the system established under the Antartctic Treaty of 1959.

This new Convention extends that unique form of international cooperation which has existed under the Antarctic Treaty into a new area, into the area of resource management. Therefore, from our perspective, Mr. Chairman, this agreement also represents an important international legal and political agreement.

The Convention derives from an initiative taken by the Antarctic Treaty consultative parties in 1977 and was negotiated in the series of meetings that took place beginning in early 1978 and led to its conclusion at a conference held in Australia in 1980. Mr. Chairman, my statement summarizes in general form the provisions of the Convention. I will not, therefore, restate them at this time.

I would say, in conclusion, that the United States played a leading role in the initiation of the negotiations on this agreement. We also played a leading role in their conclusion. The Convention serves important U.S. environmental interests, important resource management interests, as well as our long-term political and legal interests in maintaining Antarctica as an area of peaceful international cooperation.

We expect the Convention will enter into force early in 1982 and that the first meeting of the machinery provided for under the Convention—the Commission for the Conservation of Antarctic Marine Living Resources—will take place in the first half of 1982.

For that reason, Mr. Chairman, we think it important that we move quickly to ratify the Convention in order that we can be represented at the first meeting of the Commission, at which a number of very important decisions relating to the implementation of the Convention in general will be taken.

Again, Mr. Chairman, we would strongly urge the Senate to move rapidly to give its advice and consent to ratification of this treaty.

I would be happy to answer any questions on either of these agreements. Thank you very much.

[Mr. Scully's prepared statement follows:]

PREPARED STATEMENT OF R. TUCKER SCULLY

I am R. Tucker Scully, Director of the Office of Oceans and Polar Affairs, Department of State. With me from the Department are Mary E. McLeod of the Office of the Legal Adviser, and Brian Hallman of the Office of Fisheries Affairs.

Mr. Chairman, the Department of State fully supports the entry into force for the United States of the Convention on the Conservation of Antarctic Marine Living Resources and urges the Senate to act rapidly to give its advice and consent to ratification of that Convention. The Convention was concluded at a conference held in Canberra, Australia, May 7–20, 1980, and was signed by the United States on September 11, 1980, by our Ambassador in Canberra.

The Convention on the Conservation of Antarctic Marine Living Resources is a significant and innovative conservation agreement. It will establish international machinery and create legal obligations necessary for the protection and conservation of the marine living resources found in the waters surrounding Antarctica. The Convention is based upon an ecosystem-wide approach to the management of marine living resources and incorporates standards designed to

ensure the conservation not only of individual populations and species, but also the maintenance of the health of the Antarctic marine ecosystem as a whole.

The marine area covered by the Convention may offer significant potential for harvesting. At the same time, scientific investigations indicate that the Antarctic marine ecosystem—which is characterized by short, simple food chains and dependency upon a single species—Antarctic krill—may be particularly vulnerable to uncontrolled harvesting. For this reason we are pleased that the Convention has been concluded prior to the initiation of large-scale harvesting activities. Implementation of the Convention offers an unusual opportunity to elaborate and apply an effective management framework to these shared resources before they become subject of significant exploitation pressure.

The conclusion of the Convention also represents an important example of the international cooperation among the states active in Antarctica, pursuant to the system established under the Antarctic Treaty of 1959. The Antarctic Treaty has permitted its Parties, who assert differing position regarding claims to territorial sovereignity in Antarctica, to work together in the conduct of scientific research there and to maintain the Antarctic Treaty area as an area reserved exclusively for peaceful purposes. The new Convention extends this unique form of international cooperation into the domain of resource management and as such represents an important international legal and political agreement.

The Convention on the Conservation of Antarctic Marine Living Resources derives from an initiative taken by the Antarctic Treaty Consultative Parties in 1977. At the Ninth Regular Consultative Meeting, held that year in London, they identified the need to provide for effective conservation of Antarctic marine living resources and called for the elaboration of a regime to achieve this objective. The Convention was prepared during a series of formal and informal meetings which began in 1978 and resulted in preparation of a draft convention which was the basic working document of the Canberra Conference in May of 1980. Fifteen nations participated in the Canberra Conference: The 14 nations which are now Antarctic Treaty Consultative Parties: Argentina; Australia; Belgium; Chile; France; Federal Republic of Germany; Japan; New Zealand; Norway; Poland; South Africa; the U.S.S.R.; the United Kingdom; and the United States—along with the German Democratic Republic. Observer delegations from the European Community (EC), the United Nations Food and Agriculture Organization (FEO), the International Whaling Commission (IWC), the International Union of the Conservation of Nature and Natural Resources (IUCN), the Scientific Committee on Oceanic Research (SCOR), the Scientific Committee on Antarctic Research (SCAR) and the International Oceanographic Commission (IOC) also attended.

The Convention sets forth a conservation standard which reflects U.S. concern for an ecosystem approach to the management of Antarctic marine living resources. It provides that rational utilization is incorporated in the concept of conservation, but sets forth a commitment to ensuring the health of target and dependent populations, and of the

ecosystem as a whole, including the prevention of irreversible changes in that ecosystem.

Consistent with its conservation objectives the Convention applies to a geographic area designed to approximate the full extent of the Antarctic marine ecosystem. This area, defined by specific coordinates, extends to those waters found south of the Antarctic Convergence, or polar front, which is the transition zone between Antarctic waters to the south and warmer sub-Antarctic waters to the north. It should be noted that the Convention area is considerably larger than that covered by the Antarctic Treaty (which applies to the area south of 60° South Latitude).

The Convention on the Conservation of Antarctic Marine Living Resources deals with basic differences of view over the existence and nature of maritime jurisdiction in the Convention area among the Consultative Parties. Seven of those Parties claim territorial sovereignty and thus maritime jurisdiction in Antarctica, while the United States and the remaining Parties neither assert nor recognize such claims. The participants in the negotiations recognized that these basic differences could not be finally resolved in this new Convention. In a manner parallel to the Antarctic Treaty, however, they were able to shape the Convention and their future activities pursuant to it in such a manner that all can cooperate in elaborating an effective management system without prejudice to thier juridical positions.

The Convention also provides for the establishment of machinery necessary to carry out its objectives. This includes the Commission for the Conservation of Antarctic Marine Living Resources, which will be headquartered in Hobart, Tasmania; the Scientific Committee for the Conservation of Antarctic Marine Living Resources, designed to provide objective scientific assessments and recommendations to the Commission; and a secretariat to serve both the Commission and Scientific Committee. The Convention provides that the Commission will operate on the basis of a consensus or no-objection procedure which has been characteristic of the Antarctic Treaty system. This consensus system, which will apply to all matters of substance, is designed to produce genuine negotiated solutions in the operation of the management system.

The Convention provides a close relationship between the resource management system it seeks to establish and the Antarctic Treaty. The Convention incorporates the basic principles found in the Antarctic Treaty and recognizes that it, though a separate legal instrument, represents an evolution in the Antarctic Treaty system itself. The Convention also provides for establishment of relationships with other relevant organizations—both inter-governmental and non-governmental—such as the IWC, FAO, SCAR, SCOR, which may contribute to the effective operation of the Convention.

The Convention finally provides for participation by the European Community (EC) as a member of the Commission, in light of the fact that member states of the EC, entitled to become Parties to the Convention, have delegated certain competences covered by the Convention to the Community itself. The fact that there is divided competence among member states and the EC itself made it necessary for

the Convention to provide that both these states and the Community, as an institution, could become members of the Commission.

The Convention will enter into force thirty days following the deposit of the eighth instrument of ratification with Australia, the depositary government. Six such instruments have been received to date and it is expected that the Convention will enter into force during the first half of 1982. The Convention further provides that the first meeting of the Commission will take place within three months of entry into force. Mr. Chairman, we consider it extremely important that the United States move quickly to ratify the Convention in order that we can be represented at the first meeting of the Commission. This meeting will address a number of issues of basic importance to the effective start-up and future operation of the Convention.

In conclusion, Mr. Chairman, I would note that the United States played a leading role in the intitiation and completion of the negotiations on the Convention on the Conservation of Antarctic Marine Living Resources. The Convention serves important U.S. environmental and resource management interests, as well as our long-term political and legal interests in maintaining Antarctica as an area of peaceful interntional cooperation. At the same time we recognize that the entry into force of the Convention represents only a first step—albeit a very necessary one—in providing for effective management of Antartic marine living resources. We look forward to playing a lead role also in the implementation of the Convention as we get down to the business of applying its innovative management system.

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Thank you, Mr. Chairman and Members of the Committee. We would be pleased to answer any questions you may have relating to these agreements.

Senator PRESSLER. Thank you very much.

I do have some questions for you, but first we will hear further testimony, and we will hear first from Mr. John R. Twiss, Jr. Welcome to the committee.

STATEMENT OF JOHN R. TWISS, JR., EXECUTIVE DIRECTOR, MARINE MAMMAL COMMISSION, WASHINGTON, D.C.

Mr. TWISS. Thank you, Mr. Chairman, for inviting me to testify.

The Marine Mammal Commission supports ratification of the Convention on the Conservation of Antarctic Marine Living Resources. We believe it provides a necessary and potentially effective mechanism for assuring that whales, seals and other components of the Southern Ocean ecosystem are not adversely affected by developing fisheries, particularly the krill fishery in Southern Ocean.

At least 13 species of seals and whales, several in danger of extinction, depend either directly or indirectly on krill as a food source. Since the biology and ecology of Antarctic krill and krill-dependent species are not well documented, there is little basis for predicting how much krill can be harvested annually without having a significant adverse effect on either krill or those dependent species. Likewise, existing baseline information and monitoring programs are inadequate

to detect changes that may result from fisheries or associated activities in the distribution, abundance, or productivity of krill, whales, seals or other species.

Of great importance is the fact that the Convention recognizes that species other than target species can be affected by fisheries, and it mandates that overall management, as Mr. Scully has said, be approached from an ecosystem perspective which recognizes this fact. It also recognizes the importance of basing conservation decisions on sound scientific advice, and it calls for a Scientific Committee to determine and recommend measures to be taken to achieve the Convention's objectives.

In addition, the Convention also establishes an international Antarctic Commission to facilitate Convention implementation and operation, as well as an Executive Secretariat to assist both the Scientific Committee and Commission in their work.

In order to help the U.S. address many of the scientific questions at issue in achieving the Convention objectives, WOAA, with partial support from the Marine Mammal Commission, has organized and convened three meetings of an ad hoc scientific committee to provide advice as to actions needed to protect and conserve the Antarctic marine ecosystem.

The ad hoc committee's recommendations have been useful in negotiations already held and will be of help in developing U.S. positions on various items to be considered during the meetings of the Antarctic Commission and its Scientific Committee.

The Marine Mammal Commission is satisfied that the U.S. is now doing what it can to facilitate implementation of the Convention and that there is reason for guarded optimism that the Convention will achieve the desired purposes.

Thank you very much, Mr. Chairman.

[Mr. Twiss' prepared statement follows:]

PREPARED STATEMENT OF JOHN R. TWISS, JR.

Good afternoon, Mr. Chairman. My name is John Twiss and I am Executive Director of the Marine Mammal Commission. Thank you for inviting me to testify before your Committee.

The Marine Mammal Commission supports ratification of the Convention on the Conservation of Marine Living Resources. The Convention provides a necessary and potentially effective mechanism for assuring that whales, seals, and other components of the Southern Ocean ecosystem are not adversely affected by developing fisheries, particularly the krill fishery, in the Southern Ocean.

The Southern Ocean supports at least 13 species of seals and whales, several of which are or were in danger of extinction as a consequence of unregulated or poorly regulated sealing and whaling. Most of these species depend, either directly or indirectly, on krill as a food source and could be affected adversely if Antarctic krill stocks are over-exploited.

The biology and ecology of Antarctic krill and krill-dependent species are not well documented. At present, there is little basis for predicting how much krill can be harvested annually without having

a significant adverse effect on either krill or those species which depend upon krill. Likewise, available baseline information and existing monitoring programs are inadequate to detect changes that may result from fisheries or associated activities in the distribution, abundance, or productivity of krill, whales, seals, or other species.

Recognizing the possible effects of developing fisheries on Antarctic stocks of seals and whales, the Commission has, since 1975, undertaken a continuing review of Antarctic marine living resources. As a result of its reviews, the Commission has made numerous recommendations to responsible agencies on the need for certain research and monitoring programs as well as international agreements to assess and mitigate the possible adverse effects of fisheries. In addition, Dr. Robert J. Hofman, the Commission's Scientific Program Director, has served on the U.S. Delegation as a scientific advisor during the course of the negotiations which lead to this Convention. I regret, incidentally, that Dr. Hofman cannot be here today, but he had long-standing commitments on the West Coast.

The Convention is unique in that it will establish a mechanism for regulating fisheries before the resources upon which the fisheries depend are over-harvested. Of even greater importance, the Convention recognizes that species other than target species can be affected by fisheries, and it mandates that overall management be approached from an ecosystem perspective which recognizes this fact.

The ecosystem approach, set forth in Article 2 of the Convention, is consistent with principles of ecosystem management first legislatively expressed in the Marine Mammal Protection Act of 1972. The Convention recognizes the importance of basing conservation decisions on sound scientific advice, and it calls for a Scientific Committee to determine and recommend measures to be taken to achieve the Convention's objectives. The Convention also establishes an international Antarctic Commission to facilitate Convention implementation and operate as well as an Executive Secretariat to assist both the Scientific Committee and Commission in their work.

It is important to recognize, however, that the Convention, while basically sound, only provides the mechanism for conserving Antarctic marine living resources. Achieving the Convention objectives will actually depend upon many factors. Included among these are: the kinds and quality of fisheries and related biological/ecological data provided to the Scientific Committee, the competency of the Scientific Committee, and the willingness of the Commission and the contracting parties to adopt and implement the Committee's recommendations.

In order to help the United States address many of the scientific questions at issue, the National Oceanic and Atmospheric Administration (NOAA), with partial support from the Marine Mammal Commission, has organized and convened three meetings of an Ad hoc Scientific Committee to provide advice as to the actions needed to protect and conserve the Antarctic marine ecosystem. During the first two meetings, the group addressed factors that should be considered and provisions that should be included in the Living Resources Convention to best assure that exploitation not have a significant adverse effect on either Antarctic marine living resources or the ecosystem. Information gained during these meetings was used to help develop

U.S. positions on scientific and technical aspects of the Living Resources Convention.

At the third meeting, which was held on August 12–14, 1981, participants identified steps that might be taken to facilitate the early operation of the Commission, its Scientific Committee, and the Executive Secretariat to be established when the Convention comes into force. They noted, among other things: that there is limited knowledge of the numerical and functional relationship between and among components of the Antarctic, as well as other, marine ecosystems; that development of guidelines and procedures for translating the Convention's conservation standard into practice should have high priority; and that the success of failure of the Convention will depend on the kinds and quality of scientific and fisheries data upon which the conservation decisions are based. They recommended that a data center be established under the Executive Secretariat and that immediate efforts be undertaken to: develop standard guidelines and procedures for translating the Convention's conservation standards into operational management policies and practices; define the precise types of scientific and fisheries data needed to meet the Convention objectives; and determine how information needs might be most efficiently and effectively met. Participants recommended that papers on these topics be prepared, reviewed by the Ad hoc Committee, and provided to the U.S. delegation to assist in preparing for the first meetings of the Antarctic Commission and its Scientific Committee.

The Ad hoc Committee's recommendations were useful in developing positions for the preparatory meeting held last month in Australia. The results of that meeting, as well as the Ad hoc Scientific Committee's recommendations, are now being reviewed and will be of help in deevloping U.S. positions on various items to be considered during the first meetings of the Antarctic Commission and its Scientific Committee. In this regard, it is our intention that the Ad hoc Scientific Committee be reconvened in January or February of 1982 to provide further guidance on ways to best address the various points.

The Marine Mammal Commission is satisfied that the United States is now doing what it can to facilitate implementation of the Convention, and that there is reason for guarded optimism that the Convention will achieve the desired purposes.

Senator PRESSLER. Thank you.

I shall now call on Dr. William Y. Brown, Senior Staff Scientist of the Environmental Defense Fund, of Washington, D.C.

[Mr. Brown's biographical data follows:]

BIOGRAPHICAL DATA OF WILLIAM YANCEY BROWN

Born: Artesia, Calif., August 13, 1948.

Education

B.A. (Biology), University of Virginia, 1969.
M.A.T., Johns Hopkins University. 1970.
Ph. D. (Zoology), University of Hawaii, 1973.
J.D., Harvard Law School, 1977.

Employment

July 1981 to present: Senior Staff Scientist, Environmental Defense Fund, Inc., Washington, D.C.

February 1980 to July 1981: Executive Secretary, International Convention Advisory Commission, Washington, D.C.
July 1977–February 1980: Executive Secretary, Endangered Species Scientific Authority, Washington, D.C.
June 1976–June 1977: Consultant, Fish and Wildlife Service, Washington, D.C.
September 1975–June 1976: Scientific Director, Monitor, Washington, D.C.
Summer 1975: Special Assistant to the Senior Scientist, Council on Environmental Quality, Washington, D.C.
Summer 1974: Biologist, Environmental Protection Agency, Washington, D.C.
1973–74: Assistant Professor of Biological Sciences, Mount Holyoke College, South Hadley, Mass.
1970–71: Teaching Assistant, Physiology and Anatomy, University of Hawaii, Honolulu, Hi.
1969: High School Teacher, Baltimore, Md.
Summer 1967: Department of State, A.I.D., Recife, Brazil.

Professional and honorary societies

American Association for the Advancement of Science.
Ecological Society of America.
American Ornithologists' Union.
Wilson Ornithological Society.
Phi Beta Kappa.
Sigma Xi.
Phi Sigma.
Member of the Bar: District of Columbia Court of Appeals. U.S. District Court for the District of Columbia; U.S. Court of Appeals for the District of Columbia.
Coordinator, Board of Directors, Harvard Environmental Law Society, 1975–1976.

Publications

Many papers, notices and rulemakings published in the course of government service; twelve personal research publications on seabird ecology and behavior.

STATEMENT OF WILLIAM Y. BROWN, SENIOR STAFF SCIENTIST, ENVIRONMENTAL DEFENSE FUND, WASHINGTON, D.C.

Mr. BROWN. Mr. Chairman, I appreciate the opportunity to appear before the committee today and to present the views of the Environmental Defense Fund and eleven other environmental and conservation organizations on the ratification of the Convention on the Conservation of Antarctic Marine Living Resources.

I will present orally only selected observations and conclusions of our written testimony.

We strongly support the early ratification of the Convention by the United States. The Convention is an essential tool in the conservation of the Antarctic ecosystem. The first meeting after the Convention takes force probably will occur in March or April 1982, and it is important for the United States to be able to participate as a party.

The Convention is necessary because the potentially massive unregulated harvest of krill, a shrimp-like crustacean, currently threatens the conservation of the Antarctic ecosystem and threatens the survival of the endangered great whales that feed on krill.

The Convention was negotiated primarily to ameliorate those threats by establishing principles of conservation and mechanisms for implementation of those principles.

From the long interest of the United States in the protection of the Antarctic ecosystem and in the preservation of all endangered species, including in particular the great whales, it follows that our nation

should embrace the Convention as soon as possible and work vigorously to bring about its early and effective implementation.

The new Convention provides the first comprehensive authority and organizational capability for effective conservation of Antarctic marine living resources. No authority other than the Convention exists which can be used as an effective basis for this purpose. This conclusion is based upon a detailed analysis in our written testimony which addresses each international or domestic authority having some bearing on living resource conservation in the Antarctic.

With respect to implementation of the Convention, EDF recommends that the United States give priority to designating extensive special areas for protection and scientific study. The scale of commercial harvest in Antarctica is yet minor and need not be disrupted by ample designation of protected areas.

No U.S. commercial fishery exists in Antarctica, and to our knowledge none presently is contemplated. In light of our yet primitive understanding of the Antarctic ecosystem, areas open to harvest should be the exception rather than the rule.

Perhaps the most important and difficult conceptual task for the Commission and the Scientific Committee of the Convention is the interpretation of the ecosystem conservation principles and their translation into criteria and methods for the formulation of conservation methods. It is essential that this matter be addressed thoroughly by the United States before the first Commission meeting. Our written testimony addresses these somewhat technical issues in detail. For the sake of time, we will not present them orally here, but we would appreciate consideration of them by the committee.

[Dr. Brown's prepared statement follows:]

Prepared Statement of Dr. William Y. Brown

Mr. Chairman, I am William Y. Brown, a senior staff scientist with the Environmental Defense Fund, Inc. EDF is a private, non-profit, national membership organization with offices in Washington, D.C., New York, N.Y., Denver, Colo., and Berkeley, Calif. It has a membership of more than 45,000 individuals, including scientists, educators, lawyers, and other citizens dedicated to finding scientifically sound solutions to the nation's environmental problems. We appreciate the opportunity to appear before the Committee today and to present the views of EDF and 11 other environmental organizations [1] on ratification of the Convention for the Conservation of Antarctic Marine Living Resources (hereinafter referred to as Convention). Many of these organizations belong to the Antarctic and Southern Ocean Coalition, a group dedicated to the wise management of Antarctica's natural resources. All of these organizations are interested in the protection of the Antarctic ecosystem.

We strongly support the early ratification of the Convention by the United States. The Convention is an essential tool in the conservation of the Antarctic ecosystem. The first meeting after the Convention

[1] Center for Environmental Education, Defenders of Wildlife, Friends of the Earth, Fund for Animals, Humane Society of the United States, National Audubon Society, National Parks and Conservation Association, Natural Resources Defense Council, Oceanic Society, Society for Animal Protective Legislation, World Wildlife Fund–U.S.

takes force probably will occur in March or April 1982, and it is important for the United States to be able to participate as a party.

The purpose, negotiating history, and structure of the Convention are for the most part well described in the report of the State Department which accompanied the Convention when it was submitted to the Senate by President Carter on December 2, 1980. The report and Convention text were printed for the use of the Senate as Executive X, 96th Congress, 2d Session. The information provided in Executive X is not restated here, except as may be helpful to the Committee in evaluating the views we express.

WHY THE UNITED STATES MUST RATIFY THE CONVENTION

A potentially massive, unregulated harvest of krill currently threatens the survival of the endangered great whales that feed on krill. The Convention was negotiated primarily to ameliorate that threat by establishing principles of conservation and mechanisms for implementation of those principles. From the long interest of the United States in the protection of the Antarctic ecosystem and in the preservation of all endangered species, including in particular the great whales, it follows that our nation should embrace the Convention as soon as possible and work vigorously to bring about its early and effective implementation.

The harvest of Krill

The known ecology of krill and its potential for harvest is discussed in detail in the Final Environmental Impact Statement for a Possible Regime for Conservation of Antarctic Marine Living Resources (Department of State, June 1978), and in the publications cited in that impact statement. The information below is taken from those documents except when noted otherwise, and is intended to highlight some of the most basic parameters.

Krill are that group of crustacean species which are eaten by baleen whales. The species *Euphausia superba*, a shrimp-like creature growing to about two inches in length, is the most abundant by far and is the only commercially valuable species. For this discussion, krill refers to *E. superba*.

Krill are found in the Southern Ocean south of the Antarctic Convergence. They occur in open water and under ice, and are very abundant. An estimated 200 to 600 million tons of krill are present during the Antarctic summer. Krill often collect in large swarms varying from a few meters to several kilometers in diameter and extending downward from the ocean surface to about 100 meters. These swarms facilitate predation by whales, seals, penguins, other birds, fish, squid, and also man. Krill is the main animal prey species in Antarctica. Consequently, any substantial harvest of krill could significantly affect many predators, including in particular endangered whales.

Krill has been harvested by ships from the U.S.S.R., Japan, Chile, West Germany, Poland, Norway, Taiwan, East Germany, Spain, Korea, and perhaps other nations. Currently harvest is estimated at 120,000 to 500,000 tons per year.[2] Potentially, harvest may reach mil-

[2] An Evaluation of Antarctic Marine Ecosystem Research, National Academy of Sciences, Washington, D.C., 1981.

lions of tons per year and, if not regulated, could substantially reduce krill abundance.

Other harvest

Target species

Besides krill, fish stocks are the only other current target of significant harvest. Harvest of Antarctic cod (Notothenidae spp.) is predominant. The catch has reached about 260,000 tons per year but has declined recently, perhaps because of overfishing. Several other species of fish and squid are potential targets for harvest.

Incidental harvest

Next to nothing is known about potential harvest of non-target species incidental to the emerging krill fishery. However, the pervasive predation on krill by whales, seals, penguins, other birds, fish, and squid poses the likelihood that significant incidental harvest will occur.

Existing authority

No authority other than the Convention exists which can be used as a basis for effective control of krill harvest and conservation of the Antarctic marine ecosystem.

Antarctic Treaty

The principal existing international agreement concerning Antarctica is the 1959 Antarctic Treaty (12 U.S.T. 794). The Antarctic Treaty does not contain any provisions which themselves provide for the conservation of Antarctic marine living resources. However, Article IX of the Antarctic Treaty provides for meetings of signatories and certain other parties for the purpose of exchanging information, consulting on matters of common interest, and formulating recommended measures in furtherance of the principles and objectives of the Antarctic Treaty. These recommendations are to include measures regarding the "preservation and conservation of living resources in Antarctica."

Eleven regular Antarctic Areaty Consultative Meetings have taken place under the Antarctic Treaty and recommendations have been adopted at each meeting. At the Third Antarctic Treaty Consultative Meeting, the representatives recommended to their governments that they adopt detailed "Agreed Measures for the Conservation of Antarctic Flora and Fauna." These Agreed Measures contain several provisions pertinent to the conservation of Antarctic marine living resources. Article VI prohibits "the killing, wounding, capturing or molesting of any native mammal or native bird, or any attempt at any such act, except in accordance with a permit." Any such permit is to be issued only "to provide indispensible food for men or dogs in the Treaty Area" or to provide specimens for museums, zoos or scientific, educational or cultural uses. Certain "Specifically Protected Species" are given even greater protection. Participating governments are directed "to minimize harmful interference within the Treaty Area with the normal living conditions of any native mammal or bird." Article VIII. The Agreed Measures prohibit bringing any exotic animal or plant into the Treaty Area, except under a strictly controlled permit system (Article IX).

Article VIII of the Agreed Measures calls for the designation of "Specifically Protected Areas" which are to be listed in an Annex B and to be "accorded special protection by the Participating Governments in order to preserve their unique natural ecological system." The designation of special areas was refined at the Seventh Antarctic Treaty Consultative Meeting when criteria were adopted for reviewing specially protected areas (VII–2) and for designating sites of special scientific interest (VII–3). Beginning with the fourth consultative meeting, a number of such areas and sites have been designated and the scope of permissible activities within them has been very limited.

Unfortunately, the Antarctic Treaty Agreed Measures are of limited usefulness in marine living resource conservation because of two major limitations. First, the Agreed Measures specifically protect only mammals and birds, although Article VII and the provisions for protecting special areas and sites provide broader authority. More fundamentally, the Treaty Area to which the Agreed Measures are applicable, although defined to be the area south of 60° South Latitude, which includes a major portion of the Southern Ocean, is limited by the following clause:

> [N]othing in the Agreed Measures shall prejudice or in any way affect the rights or the exercise of the rights, of any State under international law with regard to the high seas within the Treaty Area.

The legal significance of this clause is uncertain. Some nations with fisheries interest in the Southern Ocean, no doubt, are reassured that their activities will not be checked. Because of the legitimate perception of some that the clause provides exemption, the Agreed Measures do not effectively apply to the high seas and are not an adequate regime for the conservation of Antarctic marine living resources.

Whales and seals

Direct harvest of whales and seals is currently addressed by the International Whaling Convention (TIAS 1849) and the Convention on the Conservation of Antarctic Seals (Executive K, 94th Congress, 1st Session, Senate). The marine living resources Convention expressly refrains from derogation of any rights and obligations of the Convention parties under these two agreements. However, neither of these treaties provides authority to limit harvest of krill or other species upon which protected whales and seals depend for food.

Migratory species

The Bonn Convention on the Conservation of Migratory Species of Wild Animals[3] prohibits parties, including flag vessels, from taking species listed on an Appendix I, including the blue whale, humpback whale, and the right whale, all of which occur in Antarctica. Take of these species is already prohibited under the International Whaling Convention. The Bonn Convention also requires parties to endeavor:

> (a) to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction;

* * * * * * *

[3] Adopted and signed by 22 nations at Bonn on June 23, 1979; not yet in force and not signed by the United States.

(c) to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species Article III.4.

Parties to the Bonn Convention are required by these provisions to consider the effects of any harvest of krill on blue, humpback and right whales and to endeavor to correct adverse effects. However, the usefulness of these provisions is limited in controlling Antarctic krill harvest. No mechanism is provided for the establishment of international conservation measures, the unilateral duty to take action is not unequivocally stated, and it is unclear whether the Bonn Convention will be adhered to by most participants in Antarctic harvest activities. Also, 15 nations must ratify the Bonn Convention before it enters into force, and this process may take several more years.

Domestic authority

Any purely domestic authority of the United States is of limited value in controlling the harvest of krill or other species in Antarctica because the commercial fisheries in Antarctica are foreign and are likely to remain principally foreign for the foreseeable future. Furthermore, existing domestic authority is limited.

The Antarctic Conservation Act of 1978 (16 U.S.C. 2401, et seq., hereinafter referred to as ACA) is the principal domestic legislation concerning Antarctica. The ACA implements the Agreed Measures for the Conservation of Antarctic Fauna and Flora, adopted at the Third Antarctic Treaty Consultative Meeting, and also implements recommendation VIII–3 of the eighth meeting regarding Sites of Special Scientific Interest. The provisions of the ACA generally conform to these recommendations, which already have been discussed above in the context of the Antarctic Treaty. The ACA makes the Director of the National Science Foundation generally responsible for promulgating regulations and for administering the permit system contemplated in the Agreed Measures. The ACA prescribes civil and criminal penalties for violation of the Act or of any regulations issued to implement the Act.

The ACA differs from the Agreed Measures in that there is no special treatment of the high seas. "Antarctica" is simply defined as "the area south of 60 degrees south latitude." § 2402(2). The high seas taking of any native mammal or native bird south of 60 degrees apparently is prohibited. Presumably, this prohibition extends to any whales, seals, penguins or other birds which may be taken incidental to fisheries activities. However, the United States has no immediate plans for fishery activities in Antarctic waters, and the U.S. decision to apply the Agreed Measures throughout the Treaty Area, including the high seas, has little significance for the conservation of Antarctic marine living resources generally.

New authority provided by the Convention

The new Convention provides the first comprehensive authority and organizational infrastructure for the conservation of Antarctic marine living resources.

Area of application

The Convention expressly applies to the entire area south of the Antarctic Convergence, which lies to the north of 60° South Latitude.

Unlike the Antarctic Treaty and the Agreed Measures, the Convention was principally and unequivocally intended to address harvest and associated activities on the high seas[4] (Article I).

Ecosystem conservation

The Convention establishes principles of conservation which encompass all species of the Antarctic ecosystem that may be directly or indirectly affected by harvest and which address the status of the Antarctic ecosystem as well as its constituent species (Article II). These principles may be contrasted with the other authorities discussed that generally address only the effect of harvest on target species and protect only mammals and birds. The ecosystem conservation principles of the Convention are genuinely innovative and will be addressed in more detail below.

Regulatory mechanism

The Convention establishes regulatory and scientific bodies with the authority to impose a full panoply of conservation measures. These bodies are given the flexibility to adopt or to revise such measure expeditiously. None of the other authorities discussed operates through mechanisms adequately tailored to the problems of marine living resources conservation in the Antarctic.

The principal regulatory organ of the Convention is the Commission for the Conservation of Antarctic Marine Living Resources. All signatories and certain other parties are represented on the Commission (Article VII), which makes decisions by consensus on matters of substance (Article XII). The Commission will hold regular annual meetings. The Commission's function is to provide for the conservation of Antarctic marine living resources in accordance with the principles of Article II. This objective is to be achieved through the acquisition and analysis of necessary data and the adoption of conservation measures. Such measures may include, but are not limited to, limitations on the kind, quantity, place, duration, and methods of harvest (Article IX). Special areas may be designated for protection and for scientific study. Convention measures become binding on all members of the Commission 180 days after notification, unless members object within 90 days of that notification.

The Convention also establishes a Scientific Committee for the Conservation of Antarctic Marine Living Resources (Article XIV). The Scientific Committee is a consultative body for the Commission, which is directed to take full account of the Scientific Committee's recommendations and advice. Each nation represented on the Commission is also represented on the Scientific Committee.

COMMENTS ON THE IMPLEMENTATION OF THE CONVENTION

Protected areas

The Convention directs the Commission to adopt conservation measures which include, *inter alia:*

> The designation of the opening and closing of areas, regions or sub-regions for purposes of scientific study or conservation, in-

[4] The Convention also would apparently apply to harvest of birds and any associated activities on land and ice shelves.

cluding special areas for protection and scientific study. (Article IX.2(g).

This provision is separate from Article IX.2(f) which provides for "[t]he designation of open and closed seasons for harvesting." The intent clearly is to establish a system of marine reserves which parallels the heretofore terrestrial system of specially protected areas and sites of special scientific interest.

EDF recommends that the United States give priority to designating extensive special areas for protection and scientific study in the area south of the Antarctic Convergence. Such designation, accompanied by prohibition of commercial harvesting activities, may be the only way to give meaning to the principle of Article II.3(b) of the Convention which calls for "[m]aintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources." If this provision referred to roles which organisms fill such as prey, predator, competitor or symbiont, then extinction might be the minimum that must be prevented consistent with this principle. However, such an interpretation would strip the provision of significance, because other provisions of Article II require limits on harvest well before a species would become endangered.

A better interpretation of Article II.3(b) would require the designation of protected areas of sea where commercial harvest would be prohibited and where ecological relationships can be maintained by reference to the structure and function of the ecosystem as it was before the harvest, if any, occurred. This interpretation simply would extend to the sea the well-established recognition that pristine areas should be maintained in Antarctica. The presence of substantial pristine areas in the Southern Ocean also would tend to buffer harvested areas against overexploitation. We believe that criteria for designation of areas and selected proposals for specific designations should be prepared before the first Commission meeting. It would appear advisable to approach these objectives under the auspices of SCAR—the Scientific Committee on Antarctic Research. Whatever the preparatory forum, we believe the criteria for designation should be liberal and the protected areas large. The scale of commercial harvest in Antarctica is yet minor and need not be disrupted by ample designation of protected areas. No U.S. commercial fishery exists in Antarctica and, to our knowledge, none is contemplated. In light of our yet primitive understanding of the Antarctic ecosystem, areas open to harvest should be the exception rather than the rule. We believe that the United States should take this position on protected areas, and we respectfully request the Committee to endorse this objective in its guidance to the Executive Branch.

Harvest and associated activities in open areas

In formulating conservation measures under Article IX, the Commission will be confronted with several major issues of policy. The Commission must interpret the conservation principles of Article II, and consider questions concerning burden of proof and cumulative impact.

Requirements of Article II

Article II, paragraph 3, of the Convention sets forth principles of conservation whose accomplishment is the objective of the treaty. Because of their significance, these principles are restated here:

> Any harvesting and associated activities in the area to which this Convention applies shall be conducted in accordance with the provisions of this Convention and with the following principles of conservation:
>
> (a) Prevention of decrease in the size of any harvested population to levels below those which ensure its stable recruitment. For this purpose its size should not be allowed to fall below a level close to that which ensures the greatest net annual increment;
>
> (b) Maintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources and the restoration of depleted populations to the levels defined in sub-paragraph (a) above; and
>
> (c) Prevention of changes or minimization of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades, taking into account the state of available knowledge of the direct and indirect impact of harvesting, the effect of the introduction of alien species, the effects of associated activities on the marine ecosystem and of the effects of environmental changes, with the aim of making possible the sustained conservation of Antarctic marine living resources.

Perhaps the most important and most difficult conceptual task before the Commission and the Scientific Committee is the interpretation of these principles and their translation into criteria and methods for the formulation of conservation measures. It is essential that this question be addressed thoroughly by the United States before the first Commission meeting. Although any conclusions on this matter at this time must be preliminary, EDF offers the views below to this Committee.

Optimum sustainable population

Paragraph (a) and the second clause of paragraph (b) should be interpreted to mean that harvest and associated activities must not cause any population in the Antarctic ecosystem, whether or not harvested itself, to be reduced below the level of greatest net annual increment. Furthermore, harvest and associated activities must be restricted by conservation measures to the extent that such measures would facilitate the recovery of any depleted populations to levels at or above the level of greatest net annual increment. It would seem appropriate to equate the level of greatest annual increment with the lower level of "optimum sustainable population" (maximum net productivity), as defined by the National Marine Fisheries Service under the Marine Mammal Protection Act, 16 U.S.C. 1361, et. seq.:

> "Optimum sustainable population" is a population size which falls within a range from the population level of a given species

> or stock which is the largest supportable within the ecosystem to the population level that results in maximum net productivity. Maximum net productivity is the greatest net annual increment in population numbers or biomass resulting from additions to the population due to reproduction and/or growth less losses due to natural mortality. 50 C.F.R. 216.3.

With such an interpretation, this part of Article II simply requires that any population affected by harvest or associated activities in Antarctica is to be afforded the protection of conservation measures intended to maintain the population within the range defined by OSP, or to restore it to this range if depleted. The National Marine Fisheries Service has now had several years of experience in determining whether marine mammal populations are at OSP, most recently in evaluating an application of the Japanese salmon gillnet fishery for incidental take of marine mammals in the North Pacific. The U.S. experience under the Marine Mammal Protection Act should be useful in addressing this similar matter under the Convention. The situation under the Convention is complicated by its applicability to all populations, not just marine mammals. Care in the selection of vulnerable species and indicator species for research and monitoring should make compliance with this principle feasible.

Protected areas

The first clause of Article II.3(b) calls for "[m]aintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources." As discussed previously, we believe that this clause is best interpreted as requiring substantial areas to be kept free from commercial exploitation, such that ecological relationships will be maintained in a pristine state. These protected marine areas would serve as buffers to the impact of exploitation in adjacent waters that may be open to harvest.

Reversibility of impact

Subparagraph 3(c) of Article II requires "[p]revention of changes or minimization of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades." Developing criteria and methods for this principle will require careful and imaginative thought. However, the principle is an important innovation in conservation law because it addresses the resilience of an ecosystem to harvest and associated activities, rather than just desired states of an ecosystem, such as attainment of OSP population levels.

The simplest application of subparagraph 3(c) concerns the introduction of alien species. Introduction and successful establishment of virtually any alien species in the Antarctic ecosystem would permanently alter the ecosystem, at a minimum by addition of one species, and therefore would not be consistent with the requirements of subparagraph 3(c). The United States should advocate the adoption of a conservation measure in the Commission that would prohibit introduction of any alien species into the Antarctic ecosystem unless the existence of the species in Antartctica can be easily terminated (e.g., sled dogs).

Preventing changes in the marine ecosystem which are not reversible in 20 or 30 years generally calls for ecological modelling that simulates

relevant parameters of the Antarctic marine ecosystem and predicts the nature and rate of ecosystem response to harvest and to protection. Development of useful models will require intensive initial work by one or a few individuals expert in this area of ecology, linked to the growing base of catch and effort data and basic biological information. Public review also is essential. We will not attempt to describe the elements of any such models here. It is most important now to recognize that development of such a model or models should receive priority.

Convention parties are to pursue the reversibility principle of subparagraph 3(c) taking into account "the state of available knowledge of direct and indirect impact of harvesting . . . the effects of associated activities on the marine ecosystem and [of] the effects of environmental changes, with the aim of making possible the sustained conservation of Antarctic marine living resources."

These provisions can best be implemented through the following measures: All harvest and associated activities should be prohibited unless approved by the Commission. The Commission should consider on the merits only those project applications which are accompanied by adequate supporting documentation. Approval should be granted only if the activity in question, and other reasonably foreseeable activities having cumulative impact, are determined to be consistent with the requirements of Article II. In particular, the activity should be consistent with maintaining all affected species at OSP, or restoring them to that level if below, and consistent with the potential full recovery of the affected ecosystem to pre-harvest structure and function within 20 or 30 years. EDF recommends that the United States endeavor to implement the measures described above.

Requiring prior Commission review of harvest and associated activities would be consistent with the approach to mineral resources activities that has been proposed by the State Department for the negotitation of a regime on this subject.[5] We recognize that several nations are already harvesting living resources in the Southern Ocean. We recommend that our proposed general rule of prior review and approval be modified for those activities currently underway, but only for a fixed period of time. Following passage of that time, say two years, the activities must be approved by the Commission or must cease. We recognize that negotiation of such a conservation measure will not be easy, particularly in light of the consensus rule of the Convention, but the measure would greatly enhance the Convention's effectiveness and is worth the effort.

Domestic institutional arrangements

The Administration is currently developing implementing legislation for the Convention. Although not finalized, we understand that the proposed legislation will address agency roles in selecting representatives to meetings and will establish sanctions for violation of the treaty. To date, the Department of State, National Science Foundation (NSF), Marine Mammal Commission (MMC), and National Oceanic and Atmospheric Administration (NOAA), have led the U.S. Government in matters concerning the Convention. We believe that

[5] Draft Environmental Impact Statement Concerning the Negotiation of an International Regime for Antarctic Mineral Resources. Department of State July 1981. Sections 1.5, 2.5, and 6.4.5.

participation of these agencies has been fruitful and should continue. Furthermore, the implementing legislation should assign each a concrete role in selection of representatives. The Department of State should be charged with selection of U.S. representatives to Commission meetings, in coordination with the NSF, MMC, and NOAA. The NSF should be responsible for selecting Scientific Committee representatives, in coordination with the Department of State, MMC, and NOAA. It is particularly important that the MMC be included in this legislation. Although tiny by comparison to the other agencies involved, the MMC has played a major role in development of the Convention and offers unique expertise in the biology and conservation of whales, and other marine mammals, which are the most vulnerable component of the Antarctic ecosystem.

Although passage of implementing legislation is essential to effective U.S. participation in the Convention, it is important to ratify the treaty without delay and to address the implementing legislation subsequently. The United States will not be able to participate at the first meetings of the Commission and Scientific Committee unless it becomes a party in the next several months. Furthermore, we understand that the State Department has adequate resources for U.S. participation during the interim period.

Research

The emerging harvest of krill calls for enhanced funding of Antarctic ecological research just as it calls for the harvest regime established by the Convention. Such research is not simply academic—a better understanding of the Antarctic ecosystem is common sense insurance against the ecological and economic damage that overharvest may cause. A good analysis of basic research needs from a domestic perspective is contained in "An Evaluation of Antarctic Marine Ecosystem Research," published this year by the National Academy Press. In general, we endorse this report. However, we also would give high funding priority to the development of models that could be used to implement the ecosystem conservation principles of Article II of the Convention and to the collection of data which is pertinent to the application of such models.

Participation of organizations and individuals

The Convention provides for participation of non-governmental organizations and individual scientists. Article XIV.3 states that "[t]he Scientific Committee may seek the advice of other scientists and experts as may be required on an *ad hoc* basis." Article XXII of the Convention states:

> 3. The Commission and the Scientific Committee shall seek to develop co-operative working relationships, as appropriate, with intergovernmental and non-governmental organizations which could contribute to their work . . .
>
> 4. The Commission may enter into agreements with the organizations referred to in this Article and with other organizations as may be appropriate. The Commission and the Scientific Committee may invite such organizations to send observers to their meetings and to meetings of their subsidiary bodies.

These provisions of the Convention establish a policy that favors extensive participation by individuals and organizations which do not represent national governments. We endorse this policy, which we believe will go a long way to ensure the scientific integrity of the Convention. We also recommend several refinements of the policy which should facilitate its implementation. With respect to the attendance and participation of observers at Commission and Scientific Committee meetings, EDF recommends that the United States seek approval of any requests for invitations subject to the availability of space and to limitations on active participation as may be necessary because of constraints on time. Given that time and space allow participation, selective admission of observers would waste time and energy and would unnecessarily undermine the open perspective which has characterized Antarctic matters.

EDF recommends routine inclusion of environmental group representatives and non-governmental scientists at Committee meetings. We also hold the view that the position of U.S. representative to Scientific Committee meetings should be open to scientists who are not employed by the federal government. Such an approach would buttress the scientific independence of the Committee.

This concludes our testimony on the Convention. We are confident that, having heard the testimony presented at this hearing, the Committee will support early ratification of the Convention. We are prepared to assist the Committee in any way we can, and we look forward to future work with the Committee during consideration of implementing legislation for the Convention.

Thank you.

Senator PRESSLER. Thank you.

The waters surrounding Antarctica constitute a rich and distinctive marine ecosystem. This system is characterized by short, simple food chains and the dependence of a large number of species upon a single food source, krill. Antarctic krill, a small, shrimplike crustacean, is food in enormous quantities in Antarctic waters and has become the object of considerable interest because of its potential for commercial harvesting.

Concern with the possible effects for large-scale harvesting of krill, a primary food source for the great whales, was a major impetus to the negotiation of the Convention.

Would you briefly describe the conservation standard embodied in this Convention and how it differs from other conservation agreements, Mr. Scully?

Mr. SCULLY. Thank you, Mr. Chairman.

In general terms, the negotiations on this Convention drew from the lessons that we have learned in other international resource management instruments which deal with living resources, many of which at least started upon a single species management basis.

In other words, they were directed toward the development of management objectives and management criteria which applied only to target species which were themselves the subject of harvesting. Many of these other agreements obviously have witnessed difficulties both in terms of being ineffective in protecting the species to which they were directed, but also in having unexpected side effects.

So we were offered the opportunity in addressing the Southern Ocean, which had been an area largely removed from exploitation activity, to apply and develop new methodologies that might draw upon the examples of other instruments and avoid some of the difficulties that they had found.

Now, the standard itself which is incorporated in this Convention does in fact provide for harvesting. It does specifically apply that conservation does incorporate the concept of rational utilization of resources. At the same time, however, the standard, the objectives of the Convention seek to maintain the harvested populations, populations which are the target of exploitation activities, at a healthy level based upon a standard which is comparable to maximum net productivity; to maintain not only the target species at those levels but to ensure that dependent or related species, species which depend on or are related to target species, are maintained or that they are restored to such levels; and finally, to ensure that the ecological systems as a whole, that changes in those systems which are not reversible over short periods of time, are prevented.

So the conservation standard seeks to address not only those species and populations which are the direct target of fishing activities but to ensure that those related species and the system as a whole are maintained in a healthy state.

Senator PRESSLER. Thank you.

I would ask our other witnesses to comment for the record. I would normally hear from you, but at 3:30 we have another Foreign Relations Committee meeting which already has started which I am expected to be at. So you will have a chance to put it on the record if you wish, that is, your responses.

I have several other questions which I will ask all three of you for the record. I will just tell you what these questions are.

Two: The area of application. The Antarctic Treaty applies to the area south of 60 degrees South Latitude. Earlier in the discussion of the new Convention of the Antarctic Marine Living Resources, it became clear that the Convention should cover a large area because the range of the species involved extends well north of the area of the Antarctic Treaty, up to the Antarctic Convergence or polar front, which is an oceanographic boundary between Antarctic waters to the south and warmer sub-Antarctic waters to the north. Therefore, it was agreed that it was important for the Convention to apply to all waters south of the convergence.

How does the Convention define the area in which it applies? Are there any marine living resources found in Antarctic waters which roam beyond the treaty areas? How can the Convention area include islands which clearly fall under the national jurisdiction of certain countries?

Those questions certainly, Mr. Scully, and if you would like to make a comment, you are welcome. You will get these in writing.

Three: The claims issue. Under the Antarctic Treaty the U.S. neither asserts nor recognizes claims to territorial sovereignty in Antarctica. Five other consultative parties share the U.S. view. The remaining seven consultative parties, however, assert such claims to the territorial sovereignty in Antarctica.

Because the claimant states consider the jurisdiction over marine resources derives from territorial sovereignty, the participants in the negotiation had to deal with their basic differences of view over the existence and nature of maritime jurisdiction in the Convention area.

How does the Convention deal with the difficult issue of territorial claims? Does this Convention in any way jeopardize the U.S. position on this issue?

Let me say I think it is very important for the State Department to answer these questions in a brief but pointed way so that as we circulate this as it comes to the floor there will be clarity, as well as the two witnesses may voluntarily if they wish answer these, but the State Department in particular, I think these are important unless they are covered. If they are covered in your earlier written statement, you can just refer to the paragraph because I don't want to make a lot of printing here for my chairman.

Four: Decisionmaking. From the outset, the participants of the negotiation look to the Convention to establish organizational machinery for conserving the resources of the Antarctic marine ecosystem. The question of how management decision would be made within this organization was obviously of basic importance.

Briefly describe the organizational machinery created by this Convention and the manner in which decisions will be made within those organizations. Will the reliance on consensus allow the Soviets and Japanese to veto any proposed conservation measure?

What are the functions of the Commission and scientific council created by this Convention? Who will finance these organizations? Does this Convention have an effective enforcement mechanism?

Five: Links with the Antarctic Treaty. The relationship between the Convention on the Conservation of Antarctic Marine Living Resources and the Antarctic Treaty was also an important question in the negotiations. As the Antarctic Marine Ecosystem covers an area larger than the area of the Antarctic Treaty and because it was anticipated that there could be different parties to the new Convention, it was recognized early on the Convention on the Conservation of Antarctic Marine Living Resources should be a treaty distinct from an independent of the Antarctic Treaty.

However, it was also recognized that the new Convention could implement the Antarctic Treaty and the two could be closely linked. How does the Convention interact with or relate with the Antarctic Treaty? Does it in any way supersede or undermine the provisions of that treaty?

Six: Participation by the European Community. Four of the countries participating in the Canberra Conference—Belgium, France, the Federal Republic of Germany and the United Kingdom—are members of the EC. Under the Community's common fisheries policy, these countries have transferred certain legal competences to the Community on some of the matters covered by the Convention.

This fact made it necessary that the Community as an institution, along with four members countries, all become parties to the Convention and participate in the work of the conservation institutions which it would create. Negotiation of the matter in which this shared competence would be reflected in the Convention, particularly in the

decisionmaking system of the conservation institutions, was a complex and difficult matter.

How was the issue of the participation of the European Community resolved without giving the European countries a double vote?

Seven: Interagency Controversy. There is an interagency controversy over who should appoint scientific community representatives. The National Science Foundation has a history of funding all research and logistical support activities in Antarctica. However, the National Oceanic and Atmospheric Administration is interested in getting control of Antarctic matters and is seeking to be given this authority.

Do you know roughly the size of the National Science Foundation's budget for Antarctic research and logistics in fiscal year 1982? Do you know the size of the National Oceanographic and Atmospheric Administration's budget for similar activities?

Is it appropriate for the National Science Foundation to have the lead in designating scientific community representatives?

The Marine Mammal Commission played an important role in the development of this Convention. Will the Marine Mammal Commission be given a specific advisory role in Convention implementation, including in particular the choice of Commission and Scientific Committee representatives?

Does the impending increase in harvest of Antarctic marine resources call for a strengthened applied research program as insurance against over-exploitations?

Eight: Alternatives to the Convention. The final environmental impact statement on this Convention was implemented in 1978. This statement discusses in some detail the options other than this Convention which were available to the United States.

Could you summarize briefly the alternative actions that could have been taken and the reasons why the United States rejected these options?

What will the impact of the commercial harvesting on the various Antarctic species and the overall Antarctic ecosystem be? What will be the unavoidable adverse environmental impacts of this Convention?

Those are the questions. I read them to you because I want to emphasize that we will be reading your responses.

I want to compliment staff on doing a good job here. I am sorry that we cannot receive your answers today orally, but we would like to have answers from Mr. Scully on each point. The other two witnesses at their option may anwer or comment on any of the questions.

Does anyone here have further business before this committee?

[No response.]

Senator PRESSLER. If not, the committee stands adjourned.

[Additional questions and answers follow:]

STATE DEPARTMENT'S RESPONES TO ADDITIONAL QUESTIONS SUBMITTED FOR THE RECORD

Question 1. Could you briefly describe the conservation standard embodied in this Convention and how it differs from other conservation agreements?

Answer. The conservation standard embodied in Article II of the Convention reflects an ecosystem approach to the management of the

living resources found in the waters surrounding Antarctica. It recognizes that rational utilization of the resources covered is included in the concept of conservation but elaborates a threefold commitment to:

Ensuring the health of harvested populations

Maintaining the ecological relationships between harvested, dependent and related populations, as well as the health of such populations; and

Prevention of irreversible changes in the marine ecosystem.

The Convention on the Conservation of Antarctic Marine Living Resources represents one of the first international efforts to apply an ecosystem approach to the management of shared resources. In so doing, it breaks with the single-species approach which has characterized other conservation agreements dealing with management of fisheries. The negotiation of the Convention also constitutes an effort to establish a management system for marine living resources prior to, rather than after, the emergence of significant fishing pressure—the latter all too often having been the case with other conservation agreements.

Question 2. Will this standard achieve the U.S. conservation objectives expressed during the negotiation of this Convention?

Answer. The conservation standard satisfies the U.S. objective that the Convention reflect an ecosystem management approach. Conclusion of the Convention, however, does not automatically ensure implementation of the standard and U.S. conservation objectives. Realization of the standard will require development of specific criteria and methodologies for applying an ecosystem approach, coordinated scientific efforts to establish the necessary data base, elaboration of effective techniques to monitor and assess the status and trends of populations and possible changes in their ecological relationships; and various other implementing actions. In short, conclusion of the Convention with the conservation standard is an important first step toward achievement of U.S. conservation objectives. Full satisfaction of these objectives will depend upon continuing and concerted efforts by the United States in cooperation with the other Parties to the Convention.

Question 3. How does the Convention define the area to which it applies?

Answer. The Convention applies to the waters south of the Antarctic Convergence or poplar front—which is a complex transition zone between Antarctic waters and warmer sub-Antarctic waters and which fluctuates, both in time and space, in response to environmental conditions. The Convention delineates the area to which it applies by a specific set of geographic coordinates which are designed to approximate the location of the Convergence.

Question 4. Are there any marine living resources found in Antarctic waters which roam beyond the Treaty area?

Answer. Yes. The Convention applies to the populations of fin fish, molluscs, crustaceans and all other species of living organisms, including birds, found south of the Antarctic Convergence. This includes a number of species—birds and cetaceans, for example—which migrate over long distances and which are found in the Con-

vention area on a seasonal basis. The Convergence, however, represents, in the view of the scientific community, the most appropriate point of reference for describing the Antarctic marine ecosystem. Antarctic krill, for example, are only found south of the Convergence.

Question 5. How can the Convention area include islands which clearly fall under the national jurisdiction of certain countries?

Answer. During the negotiations, France, as one of the nations with islands clearly under national jurisdiction within the proposed Convention area, expressed serious reservation over inclusion of waters around these islands on the grounds that the implication might be created that its sovereignty was disputed. A solution was found which permitted France and other countries in similar situations to accept inclusion in the Convention area of waters around the islands in question. This solution, which supplemented the juridical provisions of the Convention itself, took the form of a statement by the Chairman of the Canberra Conference regarding how the Convention would apply to such islands. This statement was included in the Final Act of the Conference without objection.

Question 6. How does the Convention deal with the difficult issue of territorial claims?

Answer. The participants in the negotiation recognized that the Convention, like the Antarctic Treaty, could not finally resolve differences over claims to territorial sovereignty and claims to related maritime jurisdiction. Basing their efforts upon the Antarctic Treaty, they were able to structure the Convention and future actions under it in such fashion that all participants can cooperate in creating and implementing an effective management system without prejudice to their legal views. The specific formulation of this accommodation is found in Article IV of the Convention which, to meet the legitimate concerns of those countries with uncontested sovereignty over islands within the Convention area north of 60° South Latitude, includes a reference to coastal state jurisdiction.

Question 7. Does this Convention in any way jeopardize the U.S. position on this issue?

Answer. No. The Convention article (Article IV) incorporating the juridical formulation makes clear that the Convention, as well as actions and activities thereunder, do not prejudice the basic positions of the Contracting Parties on claims to territorial sovereignty and related maritime jurisdiction in the Convention area. Therefore, the Convention in no way affects the position of the United States under the Antarctic Treaty with regard to territorial sovereigny in Antarctica. It is the U.S. position under the Antarctic Treaty neither to assert nor to recognize claims to territorial sovereignty in Antarctica. As a corollary to this position, the United States does not recognize that a claim to territorial sovereignty in Antarctica is capable of creating any sort of maritime jurisdiction. In our view. for instance, the reference to coastal state jurisdiction in Article IV of the Convention, is understood to refer only to waters around islands within the Convention area north of 60° South Latitude.

Question 8. Briefly describe the organizational machinery created by this Convention and the manner in which decisions will be made within those organizations.

Answer. The Convention provides for the establishment and maintenance of a commission—the Commission for the Conservation of Antarctic Marine Living Resources—whose function is to give effect to the objectives and principles of the Convention (the conservation standard). The Convention also provides for establishment of a Scientific Committee—the Scientific Committee for the Conservation of Antarctic Marine Living Resources—which is a consultative body to the Commission. The Scientific Committee is designed to provide a forum for consultation and cooperation in the collection, study, and exchange of information on the marine living resources which the Convention covers. Finally, the Convention provides for the appointment of an Executive Secretary and Secretariat to serve the Commission and Scientific Committee and perform such functions entrusted to them by the Commission.

The Convention provides that decisions by the Commission on matters of substance shall be taken by consensus, with the question of whether a matter is one of substance to be treated as a matter of substance. Decisions on all other matters shall be taken by a simple majority of the members of the Commission present and voting.

Question 9. Will the reliance on consensus allow the Soviets and Japanese to veto any proposed conservation measure?

Answer. The consensus decision-making system essentially is a no-objection procedure. Decisions of the Commission on matters of substance therefore cannot be taken in the face of serious objections by one or more of its members. The system is designed to produce genuinely negotiated decisions. It draws upon the practice of the Antarctic Treaty system in which consensus has provided an effective manner of decisionmaking over the 20 years of that system's existence. It emerged as the only generally acceptable means to balance the varying interests of participants in the negotiation. interests not only regarding the harvest of resources themselves, but also differing perceptions over sovereignty and jurisdiction in the convention area.

Question 10. What are the functions of the Commission and Scientific Committee created by this Convention?

Answer. The function of the Commission, as set forth in the Convention itself, is to give effect to the objective and principles set forth in the conservation standard and includes the following:

To facilitate research into and comprehensive studies of Antarctic marine living resources and of the Antarctic marine ecosystem;

To compile data on the status of and changes in population of Antarctic marine living resources and on factors affecting the distribution, abundance and productivity of harvested species and dependent or related species or populations;

To ensure the acquisition of catch and effort statistics on harvested populations;

To analyze, disseminate and publish the information referred to in the two sub-paragraphs above and the reports of the Scientific Committee;

To identify conservation needs and analyse the effectiveness of conservation measures;

To formulate, adopt and revise conservation measures on the basis of the best scientific evidence available;

To implement the system of observation and inspection established under the Convention;

To carry out such other activities as are necessary to fulfill the objective of the Convention.

The Convention provides that the Scientific Committee shall conduct such activities as the Commission may direct in pursuance of the objective of the Convention and shall:

Establish criteria and methods to be used in determinations concerning conservation measures;

Regularly assess the status and trends of the populations of Antarctic marine living resources;

Analyze data concerning the direct and indirect effects of harvesting on the populations of Antarctic marine living resources;

Assess the effects of proposed changes in the methods or levels of harvesting and proposed conservation measures;

Transmit assessments, analyses, reports and recommendations to the Commission as requested or on its own initiative regarding measures and research to implement the objective of the Convention;

Formulate proposals for the conduct of international and national programs of research into Antarctic marine living resources.

Question 11. Who will finance this organization?

Answer. The Convention provides that each member of the Commission shall contribute to the budget of the Commission, Scientific Committee and any subsidiary bodies. Budgets shall be adopted annually. For the first 5 years of the operation of the Convention the contribution of each member of the Commission to the budget shall be equal. The Convention provides that thereafter the Commission shall adopt a new formula, a part of which would be based upon equal sharing among all members of the Commission and a part of which would be related to the amount of marine living resources harvested by members of the Commission.

Question 12. Does this Convention have an effective enforcement mechanism?

Answer. The Convention requires that each Contracting Party take all appropriate steps with its competence, including enactment of legislation if necessary, to ensure compliance with the Convention and measures taken thereunder. In addition to this essentially "flag state" obligation, the Convention provides for the establishment by the Commission of a system of observation and inspection to promote the objective and ensure observance of the provisions of the Convention. The Convention sets forth general principles upon which the system of observation and inspection is to be based and provides for interim inspection and observation arrangements pending establishment of the formal system by the Commission. In our view, the Convention provides the basis for an effective enforcement mechanism. Achievement of this objective, however, will require concerted efforts by the members of the Commission in the implementation of the Convention.

Question 13. How does the Convention interact with or relate to the Antarctic Treaty?

Answer. It was recognized early in the negotiation that the Convention on the Conservation of Antarctic Marine Living Resources should be a treaty distinct from and independent of the Antarctic Treaty. It applies to an area larger than that of the Antarctic Treaty and envisages participation that might differ from that of the Antarctic Treaty. At the same time it was recognized that the new Convention would complement the Antarctic Treaty and that the two should be closely linked. The task in the negotiation was to find a way of extending the relevant obligations of the Antarctic Treaty to the new Convention without creating legal difficulties or obstacles to participation. The final result is the incorporation into the Convention of the basic principles of the Antarctic Treaty regarding the reservation of Antarctica exclusively for peaceful purposes and regarding the responsibility of the Consultative Parties for the protection of the environment of Antarctica. We believe that this represents a reasonable balance between the concerns and interests of the Consultative Parties and those of non-Consultative Parties who may become Parties to the new Convention.

Question 14. Does it in any way supersede or undermine the provisions of that treaty?

Answer. No. In our view it complements and strengthens the Antarctic Treaty and the Antarctic Treaty system.

Question 15. How was the issue of participation by the EC resolved without giving the European countries a double vote?

Answer. The Convention provides that during Commission consideration of any item requiring a decision it would be made clear whether a regional economic organization (such as the European Community (EC)) will participate in the taking of the decision, and if so, whether any of its member states will also participate. The number of Contracting Parties so participating shall not exceed the number of member states of the regional economic integration organization which are members of the Commission. For example, if four states of the EC, and the EC itself are members of the Commission (a total of five members), no more than four of those members (in any combination that may be agreed among themselves) may participate in the taking of a decision on any issue.

Question 16. Do you know roughly the size of the National Science Foundation's budget for Antarctic research and logistics in fiscal year 1982? Do you know the size of the National Oceanic and Atmospheric Administration's budget for similar activities?

Answer. The fiscal year 1982 budget has not yet been approved. The current proposed fiscal year 1982 budget for the United States Antarctic Program by the National Science Foundation is roughly $61.1 million. The expenditures in the proposed fiscal year 1982 budget of the National Oceanic and Atmospheric Administration for similar activities is roughly $150,000.

Question 17. Is it appropriate for the National Science Foundation to have the lead in designating Scientific Committee representatives?

Answer. In our view, the NSF should have a major role in designating the U.S. representative for the Scientific Committee. We envisage

the selection process as being one that would involve concurrence of the National Science Foundation, the National Oceanic and Atmospheric Administration, and the Department of State and consultation with the Marine Mammal Commission.

Question 18. The Marine Mammal Commission played an important role in the development of this Convention. Will the Marine Mammal Commission be given a specific advisory role in Convention implementation, including in particular the choice of Commission and Scientific Committee representatives?

Answer. The Marine Mammal Commission exercises statutory responsibilities with regard to species covered by the Convention on the Conservation of Antarctic Marine Living Resources. For this reason, and because of its involvement in the negotiation of the Convention, we believe it appropriate for the Marine Mammal Commission to be accorded a consultative role in the implementation of the Convention by the United States. We would welcome Marine Mammal Commission advice on the choice of U.S. representatives to the Commission and Scientific Committee, as well as Marine Mammal Commission participation in U.S. delegations to those bodies.

Question 19. Does the impending increase in harvest of Antarctic marine resources call for a strengthened applied research program as insurance against over-exploitation?

Answer. Implementation of the Convention on the Conservation of Antarctic Marine Living Resources in an effective manner will depend in large part upon the development of a sound data base upon which to make the required decisions concerning conservation measures. In our view this will require emphasis upon both basic research to extend our understanding of the ecological systems involved and applied research to monitor the status and trends of the relevant populations of Antarctic marine living resources.

Question 20. Could you briefly summarize the alternative actions that could have been taken and the reasons why the United States rejected these other options?

Answer. Negotiation of the Convention on the Conservation of Antarctic Marine Living Resources represents one point on a continuum of possible approaches to Antarctic marine living resources. In considering alternative actions that could have been taken, five general options on this continuum were identified in the Final Environmental Impact Statement. Each of these alternative actions was considered to be less desirable than the proposed Federal action. These five alternatives and the reasons for their rejection can be summarized as follows:

No action to seek to conserve Antarctic marine living resources: This option rests upon the assumption that establishment of a system to regulate the harvesting of Antarctic marine living resources is not necessary at least for the near future. This approach runs counter to the scientific view that the Antarctic marine ecosystem may be particularly vulnerable to overharvesting and its corollary that a conservation regime should be established prior to the initiation of large-scale fishing activities. Deferral of efforts to develop a regime until significant fishing had been launched

would reduce the possibility of achieving an effective system as "after-the-fact" efforts at regulation elsewhere in the world have demonstrated.

National action to conserve Antarctic marine living resources, with coordination among nations taking action: This approach would seek to build an essentially voluntary system of management. It suffers from a number of practical drawbacks. In the absence of international obligations binding upon all Parties, such a coordination system could produce inconsistent, and even contradictory, application of conservation standards. It would be inherently unstable and would tend to accord undue influence in the development and implementation of conservation measures to those nations actively engaged in fishing activities.

Negotiation of an international agreement setting forth the obligations and means to collect, exchange and analyze data on Antarctic marine living resources, coupled with a commitment to later establishment of a mechanism to develop and implement necessary conservation measures: This alternative would concentrate upon the first necessary steps toward adequate conservation of Antarctic marine living resources—establishment of the necessary data base. This gradualist approach suffers from the disadvantage that it would not create the necessary incentive for establishment of the management system. As a result, it could lead to deferral of efforts to set up that system until after large-scale harvesting had been initiated, with consequent difficulties for negotiating an effective regime and consequent risks to the ecosystem.

Negotiation of an international agreement establishing a complete conservation regime and imposing from the beginning specific conservation measures or a moratorium on harvesting until conservation measures are developed: This approach incorporates the proposed Federal action with the addition of the negotiation of specific conservation measures or a conditional moratorium on harvesting from the outset. This approach is a more conservative one that that reflected in the proposed Federal action. On the other hand, it poses several disadvantages resulting from the fact that there does not exist sufficient data upon which to provide a scientific basis for specific conservation measures or a moratorium, at this point in time. An attempt to impose such conditions upon harvesting prior to operation of the management system could be viewed as injecting arbitrary factors into the operation of the system. Initial conservation measures based on insufficient data or a conditional moratorium might also be viewed as impossible to modify or terminate. As a result, significant disincentives could be created for countries with harvesting interests to participate in the conservation regime.

Negotiation of an international agreement flatly prohibiting all harvesting of Antarctic marine living resources: This approach rests upon a judgment that the health of the Antarctic marine ecosystem can be ensured only by its insulation from human activity. Such a ban on harvesting stands no chance of

being negotiated. States interested in the possibility of commercial harvesting would have no incentive to accept this alternative and, as a practical matter, it would be equivalent to a no-action alternative.

Question 21. What will be the impact of commercial harvesting on the various Antarctic species and the overall Antarctic ecosystem?

Answer. The impacts of commercial harvesting would, of course, depend upon whether and how such harvesting were regulated. Unregulated harvesting would have the greatest impacts—both in direct reduction of the populations of harvested species such as krill, and fin fish; and in indirect effects upon seals, whales, fish, birds, and cephalopods which depend upon the harvested species. Unregulated harvesting, therefore, would pose the maximum danger of upsetting the balance of the Antarctic marine ecosystem and the structure of its food chain. Such harvesting would tend to operate to produce short-term gains, while tending toward reduction in overall productivity in the long run.

The system establishing by the Convention on the Conservation of Antarctic Marine Living Resources, including its conservation standard, is designed to prevent over-exploitation of any Antarctic resource, maintaining the health of the Antarctic marine ecosystem, ensuring that any harvesting of one species does not adversely affect related species and maintaining long-term productivity of the entire system.

Some changes in the Antarctic ecosystem would be expected as harvesting increased under the Convention, but the anticipated changes are much less than those expected with uncontrolled harvesting. Maintaining the health of the ecosystem and retaining long-term productivity is possible under this system. Although some disturbance of the ecosystem would occur, maintenance of balance between populations would be possible with carefully regulated harvesting.

The chance of over-exploitation of any stock or damaging of a resource population by reduction of its food supply is minimized under the Convention. Recovery of whale populations is possible.

Question 22. What will be the unavoidable adverse environmental impacts of this Convention?

Answer. Any system under which harvesting of living resources may take place involves the possibility of adverse environmenatl impacts. As noted above harvesting includes the possibility of reductions in target populations, dependent or related populations and changes in the relationships among the components of the ecosystem. The Convention on the Conservation of Antarctic Marine Living Resources has as a basic objective of reducing to a minimum the possibility of such adverse environmental impacts. It aims at controlling harvesting in such fashion as to maintain in a healthy state populations of Antarctic marine living resources—whether the targets of exploitation, or dependent upon or related to such targets; restoration of any currently depleted populations (whales); and prevention of irreversible or long-term changes in the marine ecosystem. We are committed to see that the Convention is implemented so as to attain this objective.

Mr. Twiss' Responses to Additional Questions Submitted for the Record

Question 1. The Marine Mammal Commission plays an important role in Antarctic matters. However, it is not entirely clear to me how this has come to pass. Could you explain the Commission's involvement and role with respect to Antarctic issues?

Answer. There are two reasons why the Marine Mammal Commission has played an important role in Antarctic matters. The first is experience. The Commission has, among its present and past Commissioners, Scientific Advisors, and staff members, an extraordinarily strong background in Antarctic field work and the analysis of data related to the Antarctic. A number of those involved have been on more than a dozen expeditions each, and the range of field involvement has included research on seals and whales, participation in the international inspection program under the Antarctic Treaty, and field management of the U.S. scientific effort. In addition, extensive work on the analysis of data related to whales and seals has been done in the United States by a number of those associated with the Commission. This field and analytical involvement dates back to 1961. The second reason that the Commission quite naturally focused on Antarctica as a critical area was the numbers of marine mammals, over 15 million, involved and because of the tragic history of their exploitation.

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Within its first month of operation, the Commission became involved in efforts to prepare an environmental impact statement on the Convention on the Conservation of Antarctic Seals and, throughout 1974 and 1975, used its good offices to encourage the State Department to complete the needed environmental impact statement and the preparation of other materials for presentation to the Senate for its consideration. This was done in late 1975, and the Convention ratified in 1976.

Also, in late 1975, the Commission received a request from the National Science Foundation to review material relating to the conservation of krill resources in the Southern Ocean. In responding to this request, the Commission noted that krill management should be approached from the ecosystem perspective; that distribution, abundance, life history, and population parameters of affected species, including krill, are poorly understood and therefore do not provide a reliable basis for management decisions; that any krill harvest should not be of such intensity as to cause the depletion of species higher in the food web; that research in the area of "ecosystem response" should be given high priority; that the distribution, abundance, and life histories of species that feed on krill should be fully described as quickly as possible; that attention should be paid to the principle of establishing management regulations prior to exploitation; that significant effort should be devoted to defining "research needs" and starting the research; that steps should be taken to identify research needs and priorities as well as to carry out needed research; and that such other steps as may be needed to conclude an effective international agreement governing any krill fishery should be undertaken.

In 1976, the Commission, concerned with the lack of progress in addressing the conservation of living resources, other gaps in national policy with respect to Antarctica, and the fact that the Antarctic Policy Group had long been inactive, recommended to the Department of State that it: (1) promptly undertake a review and re-evaluation of U.S. policy regarding the Antarctic; (2) pursue the development of a policy to conserve the living resources of the Southern Ocean and the development of an international convention to implement that policy; and (3) undertake measures to prepare a Draft Environmental Impact Statement in the course of developing the policy and the convention. In correspondence and interagency discussions, the Commission stressed that priority should be given to a living resources, rather than a non-living resources, convention, and emphasized the need to define research needs and priorities, and to implement a research program that would help to maintain the integrity of Antarctic ecosystems.

In 1977, the Commission continued to encourage the Department of State and the National Science Foundation to develop, adopt, and pursue policies that would lead to international cooperation to protect the Antarctic marine ecosystem.

1978

Introduction

It was in late 1977 that the Consultative Parties to the Antarctic Treaty resolved at the Ninth Antarctic Treaty Consltative Meeting (19 September to 7 October 1977) that a definitive regime for the conservation of Antarctic living marine resources should be concluded before the end of 1978 and that a special consultative meeting should be convened to develop a draft convention. Since 1978 was the year in which major progress was first realized, this would appear to be an appropriate point at which to review the need for such a convention, preparations for the negotiations, the negotiations, and the Commission's thoughts as then expressed on research needed to develop the information necessary to make sound decisions with respect to the conservation of Antarctic living marine resources.

As noted here and elsewhere, the Southern Ocean is and was at that time one of the most productive marine areas on earth. It supports at least thirteen species of marine mammals, many of which have been heavily over-exploited and some of which are endangered. In spite of the endangered status of some marine mammal species, the Southern Ocean was and is relatively unperturbed by human activities when compared to other ocean areas. However, there was little doubt that its living resources were going to experience increasing pressures as a result of over-exploitation of known fishery resources elsewhere, extension of coastal state fishing jurisdictions, growing world demands for protein, and economic considerations. In fact, as of the mid-1970's, several countries had already begun, for example, to harvest Antarctic krill (*Euphausia superba*), the fundamenal species in many Antarctic food chains, and although the profitability of krill exploitation had not been established, it was clear that it might be and that the opportunity should be seized to conclude a meaningful conservation convention to protect marine mammals and other living resources from activities that could cause irreversible damage.

The Commission viewed the situation with concern for many reasons. Obviously, whales and seals did not and do not exist in the Southern Ocean independently, but depend upon and influence other living an non-living components of the ecosystem. Thus, there was a clear need to consider the potential impacts of unregulated human activities not only in light of their effects on the target species, but also with reference to their effects on associated species and the ecosystem as a whole. Although the immediate impacts of fisheries directed at species high in the food chain can sometimes be predicted, the ramifications of harvesting a species near a food chain's base are exceedingly difficult to predict in light of the many uncertainties involved. In the case of krill and many of the species either directly or indirectly dependent upon krill for food, information on distribution, population identity, abundance, and productivity is based largely upon conjecture and assumptions, rather than hard data. Thus, the risk was and is real that extensive harvesting could deplete Antarctic krill populations and, more likely, adversely affect certain species of whales, seals, penguins, fish, and squid which depend, directly or indirectly, upon krill for food. Furthermore, it was not unreasonable to assume that the discovery, exploitation, development, and collapse phases which have characterized most modern fisheries would also be experienced in the Antarctic, with attendant impacts not only on target species but dependent and related species as well, unless effective preventive actions were taken.

For those reasons, the Commission had, since 1975, sought to focus the attention of appropriate Federal agencies on essential conservation measures and research activities. Specifically, the Commission had directed its efforts towards ensuring that: (1) a convention on the conservation of living resources be concluded before unregulated taking of krill or other species could have an adverse impact on whales, seals, other species, and the ecosystem of which they are a part; and (2) research be planned and undertaken to gather critically needed information on the composition, structure, dynamics, and productivity of the Southern Ocean ecosystem.

In seeking to achieve these objectives, the Commission had by 1978 made numerous recommendations which have been noted above with respect to a conservation convention and research activities, testified before Congress as to those needs, and published a comprehensive "Review of Information Regarding the Conservation of Living Resources of the Antarctic Marine Ecosystem" to make essential information available to responsible decision makers and other interested individuals.

The Draft Environmental Impact Statement (DEIS)

In February 1978, the Department of State published a "Draft Environmental Impact Statement for a Possible Regime for Conservation of Antarctic Living Marine Resources" in preparation for U.S. participation in international negotiations to develop a regime. The Commission, in consultation with its Committee of Scientific Advisors, reviewed the DEIS and commented by letter on 20 March 1978.

The Commission recommended that the DEIS be revised, and noted that: there was a need to elaborate on details of proposed and alternative approaches before possible environmental impacts could be as-

sessed; the discussion in the DEIS should set forth meaningful conservation principles and practices and define the terms used; and discussions of necessary actions should be expanded. The Commission recommended that the expanded discussions should include, for example: acquisition of reliable information on the natural history, distribution, density, productivity, and feeding habits of species and/or populations likely to be directly or indirectly affected by harvesting or associated activities; acquisition of reliable information concerning species relationships and the biological and/or physical factors regulating the distribution and abundance of such species; identification of species and/or stocks to which conservation measures should be applied; development, implementation, and effective enforcement of quotas, regulations, etc., designed to ensure the conservation of affected populations and the ecosystem; and monitoring the status of affected species and populations.

The Commission also pointed out that "implicit in the discussion of the proposed action, and perhaps its greatest weakness, is the assumption that existing knowledge is adequate to implement a meaningful conservation regime allowing for substantial exploitation. The fact is that current information is not adequate to serve as the basis for reliable predictions concerning the impacts of substantial exploitation and that reliable information must be obtained and analyzed prior to substantial exploitation in order to avoid adverse environmental impacts. In light of the uncertainties and associated risks, the discussions here and elsewhere should be expanded to consider the desirability of a regime designed to provide the information needed for conservation of the resources while permitting effectively controlled, experimental harvesting in conjunction with the mandatory collection of needed data."

The Commission also recommended that the DEIS should be modified to discuss and evaluate at least one additional alternative that appeared to be preferable to the proposed action. The Commission suggested that such an approach be based upon the premises that: (1) any substantial harvesting will affect target species, associated species, and the ecosystem to some extent; (2) knowledge of populations and the ecosystem was inadequate to reliably predict and assess the impact of substantial harvesting; and (3) data must be gathered and analyzed in order to assess the impacts of substantial harvesting before it causes adverse impacts. For this purpose, the Commission recommended that the discussion be modified to consider this alternative course of action that would seek to negotiate a convention pursuant to which:

> (1) Harvesting in the immediate future would be limited to those levels, areas, and species which are considered by the appropriate scientific body to be such that they will not cause any irreversible changes in ecosystem structure, species composition, or relative abundance of the target or associated species;
>
> (2) Harvesting in the immediate future would be limited and designed as part of a scientific research program designed and approved by the appropriate scientific body so as to provide needed data on the impacts of harvesting on target species, associated species, and the ecosystem. To evaluate harvesting impacts,

such research harvests would include the requirement to gather and analyze besaline data on populations in both experimental areas and in such "control" areas as may be designated by the scientific body;

(3) Exploitation and taking for research would be limited to those levels, areas, and species determined by the scientific body to be appropriate, until the commission or such body as may be established, based upon the recommendations of the scientific body, were assured as to the effects of any increased harvest on target, dependent, and related species:

(a) would not reduce the target species to a level at which it ceases to play a significant functional role in the ecosystem and certainly not below the level at which it is capable of maximum net productivity (MNP), calculated with reference to the initial (unexploited) population size;

(b) would not result in ecosystem changes which might impair the ability of a target species to recover to its initial (unexploited) size and distribution. (For example, exploitation of a target species such as krill could give an associated species a competitive advantage which could lead to ecological replacement and a permanent change in ecosystem structure.); and

(c) would not cause populations or associated species, as a result of harvesting the target species, to decline below the levels at which they are capable of maximum net productivity, calculated with reference to initial (unexploited) population size, or below levels from which they can recover to present population size, distribution, and functional role in the ecosystem.

(4) The commission or such body as may be established would be required to base its determinations with respect to the criteria set forth above and upon the advice of the appropriate scientific body; and

(5) It would be required that the scientific body be given sufficient data and analyses by the party proposing exploitation to provide the basis for assurance that the criteria set forth in (3) be satisfied, and proposed harvest would not be permitted if the available data were inadequate to provide necessary assurances.

The Commission further recommended that the DEIS be modified to include expanded and, in some instances entirely new, discussions of: organization of the commission and its scientific advisory body; liaison with other international governmental and nongovernmental organizations; provision for sanctions against nations exploiting resources in ways that would diminish the effectiveness of the convention's conservation program; the convention's relationship to relevant domestic statutes (e.g., the Marine Mammal Protection Act and the Endangered Species Act); the importance of formal relationships between the proposed convention, the International Convention for the Regulation of Whaling, and the Convention for the Conservation of Antarctic Seals to ensure compliance with conservation measures established under those conventions; mechanisms for review, in consultation with the scientific advisory body, of proposals to exploit and

their potential impacts; mandatory observer exchanges; freedom to inspect vessels engaged in taking or processing as well as land stations engaged in processing or other support activities; mechanisms to ensure that harvesting, prior to the convention's entering into force, be carried out in accordance with the best scientific advice of an apolitical nature; and the importance of establishing ties with international conservation bodies in addition to the international fisheries bodies mentioned in the DEIS. The Commission also commented with respect to discussions of the food web, areas of special biological importance, the history of commercial harvesting in the Southern Ocean, scientific research, shipping traffic, environmental impacts of the proposed and alternative actions, conservation objectives, and management options.

Negotiations

As noted earlier, the Antarctic Treaty Consultative Parties agreed to certain Resolutions at the Ninth Consultative Meeting, 19 September to 7 October 1977. In addition to agreeing that a definitive regime for the conservation of Antarctic marine living resources should be concluded before the end of 1978 and that a special consultative meeting should be convened to develop a draft regime, the Parties resolved that: the regime should explicitly recognize the prime responsibilities of the Antarctic Treaty Consultative Parties; the provisions of Article IV of the Antarctic Treaty should not be affected by the regime; the regime should provide for the effective conservation of the marine living resources of the Antarctic ecosystem as a whole; the regime should extend north of the Antarctic Treaty area when necessary for effective conservation; and the regime should take into account, but not apply to, species already regulated pursuant to existing international agreements.

In response to the Resolutions, Australia offered to host a special consultative meeting to develop a draft convention. The meeting was convened in Canberra from 27 February to 16 March, 1978. Representatives of the Marine Mammal Commission participated in preparations for and served on the delegation to this and subsequent meetings. Through its representatives, the Commission advocated the strong, ecosystem-oriented, conservation approach outlined above.

Although a draft convention was developed at the Canberra meeting, all important issues were not resolved, and the meeting was reconvened in Buenos Aires, Argentina in 1978. Further informal consultations were subsequently held to address remaining unresolved points in late 1978 and 1979. By the end of 1978, a draft convention suitable as the basis for a decisive meeting had not yet been agreed upon and made public.

Research

With respect to research activities, the Commission had made certain recommendations to the National Science Foundation, the agency with responsibility for funding and managing the United States' Antarctic research activities, in 1975 and 1976.

On 14 December 1978, the Commission made further recommendations to the Foundation which are included as an attachment to this letter.

The Negotiations

Informal meetings of the Antarctic Treaty Consultative Parties were held in Washington, D.C. (September 1978), in Bern, Switzerland (March 1979) and in Washington, D.C. during the Xth Antarctic Treaty Consultative Meeting (September–October 1979), and tentative agreement on the remaining issues was reached. By the end of 1979, it seemed likely that the final diplomatic conference to conclude the Convention would be held in the spring of 1980. At the Xth Consultative Meeting, the Parties also adopted a recommendation reconfirming their commitment to the conclusion and early entry into force of the Convention.

Research-related issues

On 8 January 1979, the Commission again wrote the Foundation to underscore the importance and urgency of acting promptly on the recommendations set forth in the Commission's 14 December 1978 letter. The letter urged the Foundation to complete the recommended review of the draft Convention for scientific acceptability by late February at the outside so that there would be adequate time to develop or amend position papers in advance of the informal consultations to be held in March. With respect to its recommendation concerning the establishment of ecologically sound quotas for krill harvest and interim measures, the Commission noted that the work begun by the Ad Hoc Scientific Committee in June of 1978 should be completed by the middle of March, at the latest, so that the results would be available for discussion well in advance of the decisive meeting. Noting the close relationship between the U.S. Antarctic Research Program and the international BIOMASS program, the Commission also suggested that the Foundation might wish to seek the expert advice of the National Academy of Sciences' Polar Research Board with respect to both programs. In this regard, the Commission offered to consider transferring funds to the Foundation should it wish to ask the Polar Research Board to examine this question.

The Commission suggested to the National Oceanic and Atmospheric Administration (NOAA) that it expand and reconvene its Ad Hoc Scientific Committee to address certain of the issues, and, at NOAA's request, the Commission developed a draft scope of work and rationale for expanding and reconvening the Committee. Although the previous meeting of the Ad Hoc Scientific Committee had developed worthwhile information, the group had been unable to fully and adequately consider all relevant data and issues including the need to evaluate available data from the perspective of the conservation objectives contained in the draft Convention, assess possible second-order impacts on endangered species of the whales and examine relevant information on possible adverse effects or krill harvesting on endangered whales, make recommendations on the need to establish krill quotas by area, and comment on the specific fishery and scientific data that should be collected and exchanged.

The National Oceanic and Atmospheric Administration expanded and, from 17 to 19 April 1979, reconvened the Ad Hoc Scientific Committee on the Antarctic. The Committee considered a number of is-

sues and, among other things, concluded that: available information in the biology and ecology of Antarctic marine living resources was insufficient to identify the precise measures needed to achieve the conservation objectives set forth in the draft Convention; there was a critical need for a comprehensive multi-disciplinary, international research program in the Southern Ocean; and the United States can and should play a lead role in identifying and facilitating the conduct of necessary research programs and, toward this end, should undertake a review to identify research necessary to attain the Convention objectives and the role that the United States should play to ensure that essential research is conducted.

Consistent with the earlier recommendations of the Commission and the Ad Hoc Scientific Committee, the National Science Foundation requested of the Academy a proposal to form a committee to evaluate and make recommendations to the Foundation regarding the international BIOMASS program—a request to which the Academy enthusiastically responded. Unfortunately, unforeseen increases in the cost of supporting on-going Antarctic programs forced the Foundation to advise the Academy in mid-November that it could no longer provide support for the proposed committee. In late November, the Commission initiated discussions with the National Oceanic and Atmospheric Administration, the Council on Environmental Quality, the Smithsonian Institution, the Environmental Protection Agency, and other agencies and groups concerning the critical need for restoring support for this work. The response was sympathetic, and, although no other agencies had committed themselves financially by the end of the year, support well above that provided by the Commission was forthcoming from the National Oceanic and Atmospheric Administration and the National Science Foundation in 1980, and the review took place.

1980–81

The Convention on the Conservation of Antarctic Marine Living Resources was concluded at a Diplomatic Conference held in Australia in May 1980, and, pursuant to a resolution adopted during the Conference, a special preparatory meeting was held in Australia in September 1981 to decide on and take appropriate steps to facilitate early operation of the international Antarctic Commission, the Scientific Committee, and the Executive Secretariat to be established when the Convention enters into force. Marine Mammal Commission representatives participated in preparations for and served on the delegations to these meetings as well as that for the XIth Antarctic Treaty Consultative Meeting held in Buenos Aires in the summer of 1981. To help prepare for our participation in the September 1981 meeting, the Commission provided funds and assisted NOAA in organizing and convening a Third Meeting of the Ad Hoc Scientific Committee on the Antarctic in August 1981.

With respect to research, the National Academy of Sciences Committee under the chairmanship of Dr. John H. Steele (Director of the Woods Hole Oceanographic Institution), completed its work and distributed its report in August 1981. The report has been and is being used as a basis for evaluating and planning the U.S. Antarctic Research Program.

Question 2. Your statement makes a strong case for the importance of protecting the Southern Ocean ecosystem. What has the Commission done to make people aware of what is at stake in the oceans that surround Antarctica?

Answer. In addition to the actions described above, the Commission contracted for and published a comprehensive "Review of Information Regarding the Conservation of Living Resources of the Antarctic Marine Ecosystem." The Review discusses, among other points: Physical attributes of the Southern Ocean ecosystem; major faunal groups therein; the history of Antarctic seal and whale exploitation; the potential effects of ecosystem manipulation on living resources; the reliability of existing data and estimates; and the risks associated with making management decisions based on limited information. Included in the review are summaries of available data on krill, eight species of Antarctic whales, six species of Antarctic seals, seven species of penguins, other species of seabirds, fish, and cephalopods. Since its publication, the Review has been widely cited internationally. It is available from the National Technical Information Service (NTIS PB–289 496. 148 pp.; NTIS, 5285 Port Royal Road, Springfield, Virginia, 22161).

Furthermore, Dr. Robert J. Hofman, the Commission's Scientific Program Director and a participant in most of the meetings and negotiations previously mentioned, prepared and presented a paper on the "Conservation of Living Resources in Antarctica" at the Forty-fourth North American Wildlife and Natural Resources Conference in Canada in 1979. The paper was subsequently published by the Wildlife Management Institute, Washington, D.C.

Question 3. There is a dispute between the National Oceanic and Atmospheric Administration and the National Science Foundation as to which agency should appoint representatives to the Convention's Scientific Committee. Which agency do you believe should have the lead in designating Scientific Committee representatives?

Answer. With respect to the Marine Mammal Commission's Committee of Scientific Advisors, disinterested agencies (the Smithsonian Institution, the National Academy of Sciences, the Council on Environmental Quality, and the National Science Foundation) provide advice with respect to the appointment of members of the Committee. This has worked well, and it may well be worth considering an approach whereby the advice of a body like the National Academy of Sciences, whose Polar Research Board has been continuously involved in Antarctic matters since 1958, is sought.

MARINE MAMMAL COMMISSION,
Washington, D.C., December 14, 1978.

Dr. RICHARD C. ATKINSON,
Director, National Science Foundation,
Washington, D.C.

DEAR DR. ATKINSON: I found it useful and informative to discuss with you and Dr. Slaughter the concerns which we share with reference to necessary conservation efforts in the Southern Ocean. The Commission believes that the National Science Foundation has an

exceptionally critical role in the formulation of long-term U.S. polar policies and an equally important role in making some immediate judgments and determinatons with respect to the proposed convention on the conservation of living resources of the Southern Ocean.

With respect to both long- and short-term national needs, the Commission recommends that the National Science Foundation convene one or more groups of experts, including persons knowledgeable in marine mammalogy and marine mammal affairs, to provide the Foundation scientific and technical advice with respect to policy formulation and necessary actions to protect and conserve the Antarctic marine ecosystem. More specifically, the Commission recommends that the group or groups be asked to render scientific judgments with respect to: (a) the most recent draft of the convention on the conservation of living resources of the Southern Ocean; (b) the establishment of conservationally sound quotas for any taking of krill; (c) a listing of those data which the United States should seek to ensure are gathered from all vessels engaged in experimental or commercial fisheries; (d) the SCAR/SCOR plan for "Biological Investigations of Marine Antarctic Systems and Stocks" (BIOMASS); (e) the development of a long-term Southern Ocean research program with clearly defined objectives, carefully derived cost estimates, and a statement of support needs, both ship and aircraft; and (f) essential conservation considerations for inclusion in any convention that may be negotiated to govern the exploration and expoitation of non-living resources. The Commission also recommends that the Foundation augment its representation on the U.S. delegation involved in negotiating a living resource conservation convention to better insure strong scientific input.

Draft Convention: Before proceeding to final negotiations, the draft convention must be carefully and critically reviewed by the scientific community to determine whether the conservation principles set forth therein are sufficient. This has not yet been done. Should a group of experts find these principles to be insufficient, the group should recommend, through the National Science Foundation, appropriate language changes to be sought by the U.S. delegation to ensure sufficiency. The group should also give thought to language changes that might facilitate the operation of the commission and scientific committee to be constituted pursuant to the draft convention to better ensure that objective scientific advice is sought, provided, and heeded.

Interim Measures and Quotas: Although it is not certain that quotas will be a part of such interim measures as may be developed, it behooves the United States to intensively review available information to ensure that this country is well-prepared to argue effectively and persuasively for quotas that have been derived as a result of serious scientific consultations which have been undertaken with regard for the condition of dependent and related species as well as the target species. If this work is to be done in time for it to be useful, such consultations should begin as soon as possible. Although some U.S. scientists considered information related to potential impacts of krill harvesting this past June, the group was unable to fully consider how various levels of harvesting, in different areas, would affect not only the krill stocks but other species as well. With regard to these analyses

and, as appropriate, other recommended activities, the Commission believes that it would be valuable to include scientists from the National Oceanic and Atmospheric Administration in such discussions.

Vessels Engaged in Experimental or Commercial Fishing: An important element of any comprehensive program of research in the Southern Ocean and of such agreements as may be reached pursuant to the terms of a convention will be a clearly articulated set of data that must be collected on all vessels, regardless of nationality, that are engaged in either experimental or commercial fishing. The Commission believes that the Foundation's group of experts, in consultation with National Marine Fisheries Service scientists, could well describe such a set of data while taking cognizance, in so doing, of the contents of the BIOMASS program and the United States program.

BIOMASS: The Commission has long held the BIOMASS program to be one of great potential importance, but we have yet to see what we would view as an organized approach by the United States for participation therein. It does seem clear that if nations are to develop the understanding necessary to conserve component elements of the ecosystem, much of this work should be undertaken now. The Commission therefore feels that a careful review of the entire program, recommendations for such changes as appear appropriate, and the commitment of the United States to undertake portions of that program are overdue.

Research Program: Although the Commission recommended to the Foundation some time ago "that significant effort be devoted to defining 'Research Needs' and starting the work", we have not received a plan. The Commission's present recommendation concerning the need to develop a long-term Southern Ocean research program with clearly defined objectives, carefully derived cost estimates, and a statement of ship and aircraft support needs, is made in the belief that such a plan is even more urgently needed now and that the information, both domestic and international, is at hand to allow this to be done.

In an effort to provide some broad suggestions that may be useful for inclusion in a research plan, the Commission convened a small group of scientists earlier this year to set forth some ideas. These are enclosed with this letter, and we hope they prove helpful.

Non-living Resources Convention: As you well know, discussions concerning the exploration for and exploitation of non-living resources both on the continent and its shelves have long been a subject of international discussion. The Commission believes that the National Science Foundation has a critical role in shaping these discussions because of the Foundation's long history of support of geological and geophysical investigations both on the continent and in the ocean surrounding the continent as well as its ability to focus the attention of scientists from many disciplines upon the issues at hand. We believe that vigorous participation by biologists is essential in formulating positions to be taken during the course of discussions relating to any regime governing non-living resource exploration and exploitation to ensure that decisions are made with due regard to potential biological consequences.

U.S. Delegation: The Commission believes that U.S. delegation engaged in on-going discussions related to the convention on living resource conservation could be substantially strengthened with an increased scientific presence from the Foundation. No other agency has the ability to bring equivalent knowledge and experience to bear on the issue.

As a result of the Commission's desire to shed as much light as possible on this situation, we contracted early this year for a summarization of available information on the biology and ecology of living resources in the Southern Ocean. Although copies of the report, "Review of Information Regarding the Conservation of Living Resources of the Antarctic Marine Ecosystem", were sent to the Foundation when it was published, I failed to send one to you. A copy is enclosed.

In closing, I would like to emphasize two points. The Commission attaches great urgency to these recommendations. The time available to influence events is limited, and actions must be taken promptly. Second, the Commission views the convention under consideration as one of the most important conservation conventions to which the U.S. could become a part. It is essential that the best talent possible be focused upon the negotiation so that the many risks and uncertainties associated with harvests based on limited information and understanding are fully acknowledged and a conservative approach is thus assured.

Again, I valued the opportunity to discuss this matter of mutual concern with you and Dr. Slaughter. We are anxious to help in any way that we can.

Sincerely,

JOHN R. TWISS, Jr.,
Executive Director.

Enclosures.

MARINE MAMMAL COMMISSION

RESEARCH NEEDED TO ASSURE CONSERVATION OF SOUTHERN OCEAN RESOURCES

Economic incentives, over-exploitation of known fishery resources, extension of coastal state fishing jurisdictions, and growing human demands for protein are resulting in increasing efforts to identify and develop new fisheries in the seas surrounding Antarctica (c.f., Everson, 1977). Although present efforts are focused primarily upon whales and finfish, several countries (eg., the Soviet Union, Japan, Poland, West Germany) have begun to harvest Antarctic krill (*Euphausia superba*), the dominant herbivore in the Antarctic food web and the fundamental species in many Antarctic food chains (c.f., Green, 1977). An improperly managed fishery may well, therefore, adversely affect not only the krill stocks themselves but the structure and dynamics of the Antarctic marine ecosystem as well.

The purpose of this paper is to call further attention to the risks associated with the developing krill fishery (see Bengtson, 1978), and to identify the need for greater U.S. involvement in oceanographic and biological/ecological research in the Southern Ocean.

THE PROBLEM

With few exceptions, the histories of most modern fisheries can be divided into four phases: (1) discovery, (2) exploration, (3) development, and (4) collapse. Collapse has generally been attributed to over-exploitation which, in turn, has been attributed to poor management. Poor management appears to have usually resulted, in no small measure, from a lack of information concerning the biology and ecology of the resources, the ecosystems of which they are a part, and/or over-capitalization of the fisheries.

The Antarctic Treaty nations, recognizing the potential benefits and risks associated with harvesting living resources in the Southern Ocean, are seeking to conclude a convention for the conservation of these resources. If any such convention is to be successful, it must provide a mechanism for regulating harvesting and associated activities, and it should mandate the acquisition of basic biological and ecological information needed to make sound management decisions.

There is good reason to be concerned that fisheries will develop faster than our understanding of the nature and inter-relationships of the resources and that history will repeat itself—i.e., over-harvesting will take place before we have sufficient information to conserve target, dependent, and related species. This is a particularly serious problem with respect to krill since it is the "fundamental" species in many Southern Ocean food chains. Over-harvesting will adversely affect dependent and associated species (e.g., whales, seals, birds, fish, and squid) as well as the target species (krill). Even more significantly, over-harvesting krill could cause a change in the fundamental structure or dynamics of the ecosystem itself, and result in a "new" and less productive ecosystem.

INFORMATION NEEDS, RESEARCH OBJECTIVES, AND RESEARCH PRIORITIES

Available information on the structure and dynamics of the Antarctic marine ecosystem is not adequate to allow one to reliably predict either potential consumptive and non-consumptive benefits or how fishery development might affect the target species or the system itself (c.f., Bengtson, 1978). Furthermore, present levels of information are inadequate to serve as a baseline for detecting resource or system changes that may be caused by harvesting or associated activities. To remedy these inadequacies, a comprehensive, inter-disciplinary, multi-national research program in the Southern Ocean is needed.

Like other ecosystems, the Southern Ocean ecosystem is comprised of biotic and abiotic elements. Abiotic elements include water masses, inorganic nutrients, and the ice pack that surrounds the continent. Biotic elements include primary producers, herbivores (including, but not limited to krill) and several general classes of predators including whales, seals, birds, fish, and squid. The following discussion briefly outline some information needs, research objectives, and research priorities relative to each of the system components.

The physical/chemical environment

The distribution and abundance of biotic elements in the Antarctic marine ecosystem are determined, in part, by physical/chemical char-

acteristics of the environment. Currents and upwellings, for example, influence the distribution of nutrients which in turn influence the distribution and abundance of primary producers and organisms higher in the food web. Currents may cause dispersal of organisms, while eddies and gyres may limit dispersal. Consequently, there is a need for studies to better identify and describe basic physical units (currents, upwellings, eddies, gyres) and the chemical/biological characteristics of these units.

The ice pack surrounding the Antarctic continent almost certainly has a major influence on nutrient cycling and biological productivity. Studies to assess the structure and dynamics of the Antarctic ice pack should also be afforded high priority.

Primary producers

The distribution, abundance, and productivity of krill, fish, squid, etc. are dependent, at least in part, on the distribution, abundance, and productivity of primary producers. Thus, there is a need for additional studies to better determine species composition, growth rates, turnover rates, and physical/biological factors limiting the distribution and abundance of primary producers.

As noted above, the ice pack surrounding the Antarctic continent almost certainly has a major influence on nutrient availability and biological productivity. Therefore, studies to determine the nature and extent of this influence should be afforded high priority.

Antarctic krill

Antarctic krill is presently viewed as the living resource of greatest potential commercial value in the Southern Ocean. There are great risks (to target, dependent, and related species) associated with krill harvesting, and better information on the life history, numbers, demography, and dynamics of krill stocks in the Southern Ocean must be developed.

Standard assessment techniques must be developed and used to determine and monitor the distribution and abundance of krill stocks. The nature and function of swarming behavior must be ascertained and areas of special biological significance (e.g., breeding areas) identified. Additional laboratory as well as field studies must be carried out to better determine food requirements, growth rates, reproductive potential, and physical/biological factors which may limit distribution and abundance. Densities should be experimentally manipulated in a number of carefully chosen areas to determine how krill and dependent predator populations respond to krill harvesting.

Research programs and fishery development should be planned and coordinated to take maximum advantage of ships that will be involved in experimental and commercial fishing. Care must be taken to insure that needed research on other ecosystem components is not neglected because of the seemingly overriding importance of krill studies.

Other herbivores

Although Antarctic krill is the dominant herbivore in the Southern Ocean, it is not the only herbivore. Krill harvesting could cause a shift in the relative abundance of various herbivores and give another species a competitive advantage over *E. superba.* The replacement

species might have characteristics (e.g., absence of swarming behavior) that would make them unavailable or unacceptable for harvesting by man or other predators such as whales, seals, birds, etc. Thus, there is a need to assess and monitor the numerical and functional relationships among species which comprise the herbivorous element of the Antarctic marine ecosystem.

Since numerical, if not functional, relationships may change rapidly in response to krill harvesting, studies to assess the food habits and relative abundance of various herbivores should be initiated as soon as possible. Laboratory studies similar to those now being conducted with krill as well as field studies should be undertaken to better determine life cycles, growth rates, reproductive potentials, and physical/biological factors which may be limiting distribution or abundance of the herbivores. The relative importance of each herbivore in the diet of predators should be ascertained and monitored to detect changes which may reflect changes in the relative abundance of various prey species.

Fish

About 100 species of fish are known to inhabit the Southern Ocean. Of the nineteen species of potential commercial importance (Everson, 1977), some are either directly or indirectly dependent upon krill. Thus, an improperly managed krill fishery could result in smaller populations and smaller yields from these associated resources, Better information on the nature, magnitude, dynamics, and interrelationships of fish stocks is needed to develop management strategies which will insure the conservation of the ecosystem as a whole.

Basic information on species composition, stock sizes, and stock distributions is needed on non-commercial as well as commercial species, and should be gathered in the course of fishery development. Thus, there is critical need to establish a system whereby catch/effort statistics and related information are reported, compiled, and analyzed. Laboratory studies are needed to determine growth rates, fecundity, and factors likely to be limiting distribution and abundance. Food habits need to be described and subsequently monitored as a potentially useful indicator of changes in the relative abundance of prey species.

Cephalopods

Very little is known about Southern Ocean cephalopods. Squid are eaten by various species of whales, seals, and birds and are thought to be abundant. They are also viewed as a resource of major potential significance. Many, if not all, species may be directly or indirectly dependent upon krill. Without better information on the demography and dynamics of squid populations, it will not be possible to model the ecosystem or to predict and monitor the possible second-order effects of krill harvesting. Thus, studies are needed to determine the ecological role and importance of squid in the Southern Ocean food web.

Squid are difficult to capture and indirect sampling may well be the only cost-effective way of acquiring needed information. That is to say, it may be necessary to assess and monitor the status of squid populations using samples collected from the stomachs of predators

such as whales, seals, birds, and fish. Therefore, studies of stomach contents should be included routinely in all research programs on species which may be squid predators.

Birds

More than fifty species of birds (penguins, albatrosses, petrels, terns, etc.) inhabit the Southern Ocean. Many are dependent, either directly or indirectly, on krill and could, therefore, be adversely affected by a krill fishery. Since it would be difficult, if not impossible, to assess and monitor the abundance of each bird species or population affected by a krill fishery, one must carefully choose several indicator species or populations and then assess and monitor those parameters (e.g., feeding habits, clutch size, fledging success) most likely to be sensitive to changes in food availability. Since the krill fishery appears to be developing primarily in the Scotia and Bellingshausen Seas, bird studies initially should be concentrated on colonies in the peninsula areas (e.g., the Peninsula, the South Shetland Islands, and the South Orkney Islands).

Seals

Six species, the crabeater seal, the leopard seal, the Ross seal, the Weddell seal, the southern elephant seal, and the southern fur seal, inhabit the Southern Ocean. The crabeater seal is thought to feed almost exclusively on Antarctic krill. Although leopard seals, Weddell seals, and southern fur seals also eat krill, their degree of dependence upon krill is unknown. Leopard seals, Ross seals, Weddell seals, elephant seals, and southern fur seals feed upon fish and squid which, to varying degrees, may be dependent upon krill. Thus, krill harvesting could affect the carrying capacities of all seal populations in the Southern Ocean.

The biology, distribution patterns, and abundance of seals in the Southern Ocean are reasonably well known. Feeding habits, food requirements, reproductive rates, survival rates, and factors limiting distribution and abundance are poorly known. A reduction in available food will likely be manifested in changing food habits, decreased survival, increases in the age of first reproduction, decreases in pregnancy rates, and, ultimately, decreases in population sizes. Population size presumably will be the last parameter to change. Since population size is difficult to estimate and monitor accurately, research efforts should be focused on those parameters that are easier to measure and monitor and are likely to be more sensitive to changes in food availability.

The crabeater seal is the seal species that will receive the most direct impact of a krill fishery. The krill fishery appears to be developing primarily in the Scotia and Bellingshausen Seas and research efforts should be concentrated in these areas. Food habits, juvenile survival, age at first reproduction, and pregnancy rates are the parameters that are most likely to be sensitive to changes in food availability and efforts should be directed primarily towards assessing and monitoring these parameters.

Whales

Several stocks of large, krill-eating whales are endangered as a result of commercial harvesting in the Southern Ocean. Available information (c.f., Bengtson, 1978 and Everson, 1977) indicates that:

Krill fishing is and likely will be concentrated in ice-free areas which are, or were, the major feeding grounds of krill-eating baleen whales;

Fishing occurs and likely will occur primarily in the summer months when whales are present on the Southern Ocean feeding grounds; and

To maximize efficiency, fishing effort will be selectively focused on the same kinds of high-density krill swarms upon which baleen whales are reported to feed.

One can conclude that a commercial krill fishery will compete directly with krill-eating whales, and that the severely depleted stocks, such as those of blue, humpback, and fin whales, could be affected adversely by very low levels of krill harvesting.

The size, productivity, and food requirements of endangered whale stocks are poorly known. Without better baseline information and a monitoring program, it will be impossible to detect changes caused by krill harvesting. Therefore, research to assess and monitor the status of krill-eating whales in the Southern Ocean should be afforded high priority, and be focused at first primarily in the Scotia and Bellingshausen Seas areas because of the krill harvesting activity there.

CONCLUSION

The developing krill fishery in the Southern Ocean, if not properly managed at all stages, could cause the depletion of krill stocks, the depletion of predator populations that are either directly or indirectly dependent upon krill, and undesirable changes in the fundamental structure and dynamics of the Southern Ocean ecosystem itself. Available information on the nature, magnitude, and interrelationships of living resources is inadequate to allow one to accurately predict either first- or second-order impacts of various levels of krill harvest. In light of the risks and uncertainties associated with harvests based upon such scant knowledge and understanding, the krill fishery and other fisheries in the Southern Ocean must be developed with great caution and in concert with a comprehensive, multi-national, inter-disciplinary research program designed to provide the information needed to make ecologically sound management decisions.

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Everson, I. 1977. The Living Resources of the Southern Ocean. FAO/UNDP, Rome.

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[Whereupon, at 3:40 p.m., the committee adjourned, subject to call of the Chair.]

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ATTACHMENTS

Statement of Patricia J. Scharlin, Director, Sierra Club, International Earthcare Center, New York, N.Y.

Mr. Chairman, Members of the Committee: I appreciate the opportunity to comment on behalf of the Sierra Club at the hearing on the ratification of the Convention on the Conservation of Antarctic Marine Living Resources (hereinafter the Convention).

The Sierra Club is a citizen organization with a membership of 240,000, including members residing in almost 70 foreign countries. Founded in 1892, the Club works in the United States and other countries to restore the quality of the natural environment, to maintain the integrity of ecosystems, and to promote the prudent management of resources so that future generations will be assured of secure and healthy lives. Since 1972, the Sierra Club has had an active international program focusing on long-term global environmental issues that transcend national boundaries and whose resolution requires cooperation at the international level.

The Sierra Club's interest in the Convention grows out of more than five years of work in which it has been represented on the United States delegations at Antarctic Treaty meetings and on the State Department advisory committee. The Club is a founding member of the Antarctic and Southern Ocean Coalition, an international coalition of citizen organizations formed in 1979 to monitor the development of the region's natural resources.

The Sierra Club strongly supports the Convention as an indispensable means for the conservation of the Antarctic ecosystem, and urges the United States to ratify it as soon as possible, as have Australia, Chile, Japan, South Africa, the Soviet Union, and the United Kingdom. It is expected that a number of European and other nations will do so in the near future. The Convention's early entry into force makes it likely that the first meeting of the Commission under the treaty will take place no later than May or June of 1982. It is important that the United States be able to participate as a party to the Convention.

KRILL HARVESTING

Conservation of Antarctic marine living resources must begin with the fundamental unit or foundation species of Antarctica's ocean food chain, krill, small, shrimp-like crustaceans of the genus Euphausia. Perhaps the largest single source of protein in the sea, krill are the primary food of Blue, Fin, Humpback, Sei, Right and Minke Whales, crabeater seals, penguins, squids, numerous birds, and more than two dozen species of fish. Harvesting of this resource for human consump-

tion places humans in direct competition with the Antarctic species which must depend on krill for their survival.

Antarctic krill are found both north and south of 60 degrees South latitude, but appear to remain south of the Antarctic Convergence, which will serve as the boundary of the Convention area. Krill feed on phytoplankton, or floating microscopic plants, which flourish in the cold, nutrient-rich Antarctic waters during summer months. At this time of year, krill swarm in shoals which vary from one meter to 800 meters across. The shoals contain high concentrations of krill, providing an excellent opportunity for harvesting this resource, which contains 15 percent protein by weight.

Unfortunately, we do not know the rate of krill production, do not understand their life cycles, and do not have reliable estimates of their abundance. Exploitation of this remarkable resource despite our ignorance about such crucial aspects of krill biology could result in the displacement of krill as the central species of the Antarctic food web, in the further loss of endangered whale and other dependent marine species, and in the overall degradation of the Antarctic marine ecosystem.

In view of the potential damage to the Antarctic environment, it is imperative to establish practicable guidelines for the management and conservation of Antarctic marine living resources based on sound scientific research. In fact, the most reasonable plan would entail an ecosystem approach which recognizes both the importance of krill and the interrelations of all Antarctic marine living resources. The Convention establishes such conservation principles and methods of implementation.

THE LIMITATIONS OF EXISTING AUTHORITIES

No existing authority establishes conservation principles that include all species of the Antarctic ecosystem or takes into account the important fact that the Antarctic *is* an ecosystem in which the harvesting of any species could affect other species. Rather, existing authorities are severely limited because they address only effects on target species and because their protection extends only to mammals and birds. The Convention is unique in that it establishes ecosystem conservation principles which take all species and their interrelationships into account. A short discussion of existing authorities follows.

The 1959 Antarctic Treaty is the principal existing international agreement concerning the Antarctica. While it does not contain any provisions which themselves address the conservation of Antarctic living marine resources, Article IX provides for meetings of signatories and certain other parties for the purpose of exchanging information, consulting on matters of common interest, and formulating recommended measures to further the principles and objectives of the Treaty. These recommendations are to include measures regarding the "preservation and conservation of living resources in Antarctica."

At the 11 regular Antarctic Treaty Consultative Meetings under the Antarctic Treaty, many recommendations have been adopted. At the Third Antarctic Treaty Consultative Meeting, for example, the representatives recommended to their governments that they adopt "Agreed Measures for the Conservation of Antarctic Fauna and Flora," which contain several provisions pertinent to the conservation

of Antarctic marine living resources. Article VI of the Agreed Measures prohibits "the killing, wounding, capturing or molesting of any native *mammal* or native *bird*, or any attempt at any such act, except in accordance with a permit" (emphasis provided). Exception is made only "to provide indispensible food for men or dogs in the Treaty Area" or to provide specimens for museums, zoos or scientific, education or cultural uses. Certain "Specially Protected Species" are given even greater protection. Participating governments are directed "to minimize harmful interference within the Treaty Area with the normal living conditions of any native mammal or bird." The Agreed Measures prohibit bringing any exotic animal or plant into the Treaty Area, except under a strictly controlled permit system. Article VIII of the Agreed Measures calls for the designation of "Specially Protected Areas" which are to be "accorded special protection by the Participating Governments in order to preserve their unique natural ecological system."

The Agreed Measures of the Antarctic Treaty are of limited value in conserving marine living resources because they specifically protect only mammals and birds. Moreover, although the Treaty Area is defined as the area south of 60 degrees South Latitude (which includes a major portion of the Southern Ocean), the following clause both limits the protection afforded and confuses the nature of allowed activity: "[N]othing in the Agreed Measures shall prejudice or in any way affect the rights or the exercise of the rights, of any State under international law with regard to the high seas within the Treaty Area."

While the legal significance of this clause is uncertain, it has produced a perception that it exempts compliance with the Agreed Measures on the high seas, and therefore undermines the force of the Measures. Largely for these two reasons, the Antarctic Treaty is not an adequate regime for the conservation of Antarctic marine living resources.

The International Whaling Convention and the Convention on the Conservation of Antarctic Seals govern whale and seal harvesting. While the Convention expressly refrains from derogation of any rights and obligations of the Convention parties under these two agreements, neither of these treaties provides authority to limit the harvesting of krill or of other species upon which protected whales and seals depend for food.

The Bonn Convention on the Conservation of Migratory Species of Wild Animals was adopted and signed by twenty-two nations on 23 June 1979, but it is not yet in force and may not be for years to come; furthermore, it has not been signed by the United States. It prohibits parties, including flag vessels, from taking species listed on an AppendixI, including the Blue Whale, Humpback Whale, and the Right Whale, all of which occur in Antarctia. The Bonn Convention also requires parties: "to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction; [and] to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species."

Since commercial fisheries in Antarctic are foreign, any United States domestic authority is of limited value in controlling the harvest of krill or other species. The Antarctic Conservation Act (ACA) of

1978 is the principal domestic legislation concerning Antarctica. It implements the Agreed Measures for the Conservation of Antarctic Fauna and Flora as well as Sites of Special Scientific Interest. Unlike the Agreed Measures, however, the ACA contains no special treatment of the high seas and therefore has little significance for the conservation of Antarctic marine living resources.

THE CONVENTION

The Convention breaks new ground for the management of living resources: the first such treaty to apply an "ecosystem approach" to the management of resources, it establishes conservation principles which encompass all species of the Antarctic ecosystem as well as the interrelationships among dependent and related species. It defines the Antarctic marine ecosystems and applies to the area south of the Antarctic Convergence, most of which is situated north of 60 degrees South Latitude. The Convention may be sharply differentiated from other existing authorities, which generally address only the effect of harvesting on target species and which protect only mammals and birds, because it was conceived to squarely address harvesting and associated activities on the high seas. It has been characterized as a landmark in international law because of its ecosystem conservation standard and because it has been negotiated prior to heavy commercial pressure.

The Convention establishes several scientific and regulatory bodies to oversee and alter the implementation of its conservation measures. The principal regulatory organ is the Commission for the Conservation of Antarctic Marine Living Resources, which directs research to acquire and analyze the data necessary to set harvest levels and adopt conservation measures, as well as to set aside areas for protection and scientific study. In addition, the Convention establishes a Scientific Committee for the Conservation of Antarctic Marine Living Resources a consultative body for the Commission.

One of the Commission's functions under the Convention is to adopt conservation measures which will designate areas south of the Antarctic Convergence for protection and conservation or for scientific study. This would establish a system of marine reserves, which should be a priority in order to maintain ecological relationships. Scientific research to determine the effect of harvesting should also be accorded high priority to ensure ecologically viable commercial harvesting levels.

The Convention provides for the participation of intergovernmental and non-governmental organizations as well as individuals in the work of the Commission and the Scientific Committee. The Sierra Club strongly supports this open policy and recommends the inclusion of representatives of environmental organizations with proven interest and expertise.

CONCLUSION

The United States has had a strong interest in protecting the Antarctic ecosystem, in preserving endangered species, especially the great whales, and in supporting the principles laid down in the Antarctic Treaty of 1959. These interests would be preserved and furthered

by early ratification of the Convention by the United States as well as by strong efforts to bring it into early and effective implementation. Early ratification would also complement the strong role the United States has taken in the drafting of the Convention.

It should also be noted that governments should provide adequate funds for the Commission and the Scientific Committee to carry out their functions as set forth in the Convention. This will require approximately $1.5 million. In addition, for the Scientific Committee to fulfill its role there is a need to create a central data analysis unit.

THE SECRETARY OF COMMERCE,
Washington, D.C., October 21, 1981.

Hon. CHARLES H. PERCY,
Chairman, Committee on Foreign Relations, U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: I am writing to express the support of the Department of Commerce for the early ratification of the Convention on the Conservation of Antarctic Marine Living Resources. This Convention was signed by the United States in September 1980 and has been transmitted to the Senate for advice and consent.

The Convention is designed to conserve and manage all components of the Antarctic ecosystem. It incorporates the major objectives of the United States in Antarctica, among them:

(1) Political and Security Interests—including U.S. participation in the Antarctic Treaty system designed to preserve Antarctica as an area of peaceful and cooperative relationships, and to preserve U.S. options for access to that continent;

(2) Environmental and Scientific Interests—including protection and maintenance of the Antarctic environment and increased understanding of biological and oceanographic processes that are of global significance; and

(3) Resources Interests—including conservation of the living marine resources of Antarctica and provision of access for U.S. nationals to harvest Antarctic marine living resources in accordance with agreed conservation objectives and measures.

The Convention will enter into force 30 days after the eighth instrument of ratification is deposited with the Government of Australia. The first meeting of the Commission under the Convention will take place within three months after entry into force. At present, five countries—Australia, Chile, Japan, South Africa, and the U.S.S.R.—have completed the ratification process. The Government of Australia expects the Convention to enter into force by the end of 1981.

The United States has been the major catalyst for negotiation and early ratification of the Convention. It is essential that the United States conclude its ratification process soon so that it can participate in the first meeting of the Commission. For these reasons, I urge you to give your full support to early Senate ratification of the Convention.

Sincerely,

MALCOLM BALDRIGE,
Secretary of Commerce.

Prepared Statement of the National Wildlife Federation

On behalf of the National Wildlife Federation (NWF), I appreciate the opportunity to present this written statement and respectfully request that it be included in the October 27, 1981, hearing record on Ratification of the Convention on the Conservation of Antarctic Marine Living Resources.

NWF is this nation's largest, not-for-profit, citizen conservation-education organization with over four million members and supporters in all 50 states, Guam, Puerto Rico, and the Virgin Islands. By resolution at our Annual Meeting, March 26–29, 1981, the National Wildlife Federation expressed support for early ratification of the Convention on Antarctic Marine Living Resources. As one of the last unspoiled natural environments in the world, Antarctica is an area of unparalleled importance for baseline and other scientific studies. These highly simplified ecosystems, however, are extremely fragile and slow to recover from any disturbance.

Even so, oil companies from several countries appear willing to begin exploration activities in Antarctica. Such development may be hazardous to the ecosystem in a variety of ways. Although it is a huge continent, Antarctica's small, ice-free coastline is an extremely important habitat for plants and animals of the region. Onshore development would have major impacts on seals, birds, and other living resources.

Oil drilling on the offshore shelf is also extremely hazardous due to the movement of enormous ice masses in the high winds. Oil spills might damage krill, a very important food source for whales and several endangered species. Much of the marine ecosystem of the area is dependent on these small, shrimp-like crustaceans.

The Convention's ecosystem conservation standard would do much to deal with these issues. NWF urges governments signatory to the Convention to: (a) immediately begin research to determine whether krill fishing harms the recovery of endangered whale species; (b) design and fund adequate levels of cooperative, long-term biological research to implement the ecosystem standard; (c) ban krill fishing in feeding zones of blue and humpback whales until research determines the safe limits for krill harvest; (d) protect endangered whales from krill fishing and oil exploration activities; and (e) protect Antarctica and its surrounding oceans from oil exploration and development unless these activities are performed in closely regulated and environmentally acceptable manners, that are monitored by an international organization with enforcement capabilities.

NWF recognizes the need for international cooperation in the management, study, exploration, and preservation of the Antarctic's unique resources. Again, we urge the early ratification of the Convention, an essential tool in the conservation of the Antarctic ecosystem.

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